

Pascack Valley Regional High School District

**Pascack Hills High School, Montvale, New Jersey
Pascack Valley High School, Hillsdale, New Jersey**

Course Name: Science, Ethics, Technology, & Society

Born On: August, 2026
Board Approval: 8/24/26

New Jersey Curricular Mandates for Science Instruction

Disabled & LGBT:

18A:35-4.35 - History of disabled and LGBT persons included in middle and high school curriculum. A board of education shall include instruction on the political, economic, and social contributions of persons with disabilities and lesbian, gay, bisexual, and transgender people, in an appropriate place in the curriculum of middle school and high school students as part of the district's implementation of the New Jersey Student Learning Standards.

Diversity, Equity, and Inclusion (DEI):

C.18A:35-4.36a - Curriculum to include instruction on diversity and inclusion. 1. a. Beginning in the 2021-2022 school year, each school district shall incorporate instruction on diversity and inclusion in an appropriate place in the curriculum of students in grades kindergarten through 12 as part of the district's implementation of the New Jersey Student Learning Standards. b. The instruction shall: (1) highlight and promote diversity, including economic diversity, equity, inclusion, tolerance, and belonging in connection with gender and sexual orientation, race and ethnicity, disabilities, and religious tolerance; (2) examine the impact that unconscious bias and economic disparities have at both an individual level and on society as a whole; and (3) encourage safe, welcoming, and inclusive environments for all students regardless of race or ethnicity, sexual and gender identities, mental and physical disabilities, and religious beliefs. c. The Commissioner of Education shall provide school districts with sample learning activities and resources designed to promote diversity and inclusion.

Amistad Law:

N.J.S.A. 18A 52:16A-88 Every board of education shall incorporate the information regarding the contributions of African Americans to our country in an appropriate place in the curriculum of elementary and secondary school students.

Climate Change:

2026 NJSLS-Science: Earth's climate is now changing faster than at any point in the history of modern civilization, primarily as a result of human activities. Global climate change has already resulted in a wide range of impacts across New Jersey and in many sectors of its economy. The addition of academic standards that focus on climate change is important so that all students will have a basic understanding of the climate system, including the natural and human-caused factors that affect it. The underpinnings of climate change span across physical, life, as well as Earth and space sciences. The goal is for students to understand climate science as a way to inform decisions that improve quality of life for themselves, their community, and globally and to know how engineering solutions can allow us to mitigate impacts, adapt practices, and build resilient systems.

Dissection Law

N.J.S.A. 18A:35-4.25 and N.J.S.A. 18A:35-4.24 authorizes parents or guardians to assert the right of their children to refuse to dissect, vivisect, incubate, capture or otherwise harm or destroy animals or any parts thereof as part of a course of instruction.

Science, Ethics, Technology, & Society		
Unit Title	Approx # of weeks	Months
Introduction to Ethics	1-2 Weeks	September
Beginning of Life Issues	3-4 Weeks	September - October
Organ and Tissue Acquisition	3 Weeks	October
Human Experimentation	3 Weeks	November
Animal Rights & Welfare	3 Weeks	November - December
End of Life Issues	2 Weeks	January
Public Health & Global Population	2-3 Weeks	February
Climate & Environmental Concerns	3 Weeks	February - March
Science & Technology through the Years	3 Weeks	March - April
The Internet and Social Media's Impact on Society	3 Weeks	April
Technology & Governance	2 Weeks	May
Space Exploration & Colonization	3 Weeks	May - June

Science, Ethics, Technology, & Society**Unit 1: Introduction to Ethics****Related Phenomena:** “Miracle” Super crop

Discuss the ethical considerations (financial, environmental, biological) of a new GMO that is pesticide resistant, herbicide resistant, and grows abundantly in all environmental conditions. Students will consistently come back to this scenario when learning about asking relevant questions, collecting facts, identifying stakeholders, and creating strong arguments for or against actions.

- Driving Question: What conditions need to be considered when making decisions that will impact others?
- [How GMO Crops Impact Our World](#) - U.S. Food and Drug Administration (FDA.gov)

Pacing: 1-2 weeks (approximately 6-8 classes)

New Jersey Student Learning Standards (NJSLS)

HS-ETS1-1: Analyze a major global challenge to specify qualitative and quantitative criteria and constraints for solutions that account for societal needs and wants.

HS-ETS1-3: Evaluate a solution to a complex real-world problem based on prioritized criteria and trade-offs that account for a range of constraints, including cost, safety, reliability, and aesthetics as well as possible social, cultural, and environmental impacts.

Science & Engineering Practices	Disciplinary Core Ideas	Cross-Cutting Concepts
Asking Questions and Defining Problems • Analyze complex real-world problems by specifying criteria and constraints for successful solutions. Constructing Explanations and Designing Solutions • Evaluate a solution to a complex real-world problem, based on scientific knowledge, student-generated sources of evidence, prioritized criteria, and tradeoff considerations.	ETS1.A: Defining and Delimiting Engineering Problems • Criteria and constraints also include satisfying any requirements set by society, such as taking issues of risk mitigation into account, and they should be quantified to the extent possible and stated in such a way that one can tell if a given design meets them. • Humanity faces major global challenges today, such as the need for supplies of clean water and food or for energy sources that minimize pollution, which can be addressed through engineering. These global challenges also may have manifestations in local communities. ETS1.B: Developing Possible Solutions • When evaluating solutions, it is important to take into account a range of constraints, including cost, safety, reliability, and aesthetics, and to consider social, cultural, and environmental impacts.	Asking Questions and Defining Problems • Analyze complex real-world problems by specifying criteria and constraints for successful solutions. ----- Connections to Engineering, Technology, and Applications of Science Influence of Science, Engineering, and Technology on Society and the Natural World • New technologies can have deep impacts on society and the environment, including some that were not anticipated. Analysis of costs and benefits is a critical aspect of decisions about technology.

Essential Questions	Student Learning Objectives	Suggested Tasks/Activities	Evidence of Learning (Assessment)
- What are ethical questions and why are they important? - How are ethical questions different from other types of questions? - What strategies exist for addressing ethical questions? - What major considerations should people take into account when addressing ethical questions?	Student will be able to: - Analyze a major global problem by describing the challenge with a rationale for why it is a major global challenge, describing the extent and depth of the problem and the consequences to society on both global and local levels - Identify the system in which the problem exists and specify qualitative and quantitative criteria and constraints for developing acceptable solutions to the problem - Define ethics and ethical questions - Explain how relevant facts and stakeholders for an ethical situation are determined, identified, and/or resolved - Identify the Nine Theories of Ethics (Consequentialism, Values Classification, Utilitarianism, Legal Moralism, Situation Ethics, Ethical Realism, Ethical Hierarchy, Principle Ethics, Cognitive Moral Development) - Define Bioethics - Compare and contrast ethical, legal, personal, and scientific questions. - Recognize that while there can usually be several answers and approaches to an ethical question, it is important to represent a strong, well-reasoned	- Explain the difference between, ethical, scientific, and legal questions/statement and how they can also overlap (Venn Diagrams) - Design an ethical conundrum and solution using the Nine Theories of Ethics (linked in resources) - Discuss and prepare an argument in small groups why bioethics are important and taught in this course - Analyze ethical scenarios (found online or created by teacher) using reasoning based arguments - Identify and discuss scientific misconceptions and why certain groups within our population are distrustful of science - Complete case studies (Huntington's Disease & Golden Rice) requiring students to identify the important scientific and ethical facts in a scenario and defend their conclusion.	- Homework, quizzes, tests, lab activities, projects, presentations, webquests, and case studies as decided by individual teachers - Evaluate student discussions and solutions to ethical issues/case studies using a modified version of the Colorado School of Mines rubrics (see resources for link) - Complete quiz on identifying ethical, scientific, and legal questions, using the theories of ethics to analyze ethical conundrums

	argument for one's position.	
Interdisciplinary Connections	● RI.CR.11–12.1: Accurately cite a range of thorough textual evidence and make relevant connections to strongly support a comprehensive analysis of multiple aspects of what an informational text says explicitly and inferentially, as well as interpretations of the text. ● RI.MF.11–12.6: Synthesize complex information across multiple sources and formats to develop ideas, resolve conflicting information, or develop an interpretation that goes beyond explicit text information (e.g., express a personal point of view, new interpretation of the concept). ● RI.CT.11–12.8: Analyze and reflect on (e.g., practical knowledge, historical/cultural context, and background knowledge) documents of historical and scientific significance for their purposes, including primary source documents relevant to U.S. and/or global history and texts proposing scientific or technical advancements. ● W.AW.11–12.1: Write arguments to support claims in an analysis of substantive topics or texts, using valid reasoning and relevant and sufficient evidence. ● SL.PE.11–12.1: Initiate and participate effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with peers on grades 11–12 topics, texts, and issues, building on others' ideas and expressing their own clearly and persuasively. ● SL.II.11–12.2: Integrate multiple sources of information presented in diverse formats and media (e.g., visually, quantitatively, orally) in order to make informed decisions and solve problems, evaluating the credibility and accuracy of each source and noting any discrepancies among the data. ● SL.PI.11–12.4: Present information, findings and supporting evidence clearly, concisely, and logically. The content, organization, development, and style are appropriate to task, purpose, and audience. ● 1.5.12prof.Cn10a: Document the process of developing ideas from early stages to fully elaborated ideas. ● F.IF.B.6: Calculate and interpret the average rate of change of a function (presented symbolically or as a table) over a specified interval. Estimate the rate of change from a graph.	
Career Readiness, Life Literacies, and Key Skills	● 9.1.12.FP.5: Evaluate how behavioral bias (e.g., overconfidence, confirmation, recency, loss aversion, etc.) affects decision-making. ● 9.2.12.CAP.3: Investigate how continuing education contributes to one's career and personal growth. ● 9.4.12.CI.1: Demonstrate the ability to reflect, analyze, and use creative skills and ideas. ● 9.4.12.DC.3: Evaluate the social and economic implications of privacy in the context of safety, law, or ethics (e.g., 6.3.12.HistoryCA.1).	
Computer Science and Design Thinking	● 8.1.12.DA.5: Create data visualizations from large data sets to summarize, communicate, and support different interpretations of real-world phenomena. ● 8.1.12.IC.3: Predict the potential impacts and implications of emerging technologies on larger social, economic, and political structures, using evidence from credible sources.	

- **8.2.12.EC.3:** Synthesize data, analyze trends, and draw conclusions regarding the effect of a technology on the individual, culture, society, and environment and share this information with the appropriate audience.

Modifications

Multi-Lingual Learners	Students with Special Needs	At-Risk	Gifted and Talented
● Give multilingual learners with lower reading proficiency the option of focusing on the diagrams and animations, but encourage them to closely read a paragraph or two of the longer texts, so they practice and better comprehend the details shared by you and their classmates. ● Using classroom routines (such as <i>Domino Discover</i>) provides support for multilingual learners to provide different types of input, all from peers in the classroom, to students' language development. ● Allow student access to translation services such as Google Translate or PaperPal ● When possible, modify assignments so the ELL student writes less, has simpler questions to answer, fewer spelling words, etc. ● Provide models of completed homework assignments, projects, etc. ● Assign a native language partner. ● Provide extended time for written responses and reports.	● Use scaffolds, such as prompting ● Provide extended time for written responses and reports. ● Use a graphic organizer to categorize concepts. ● Get a written list of instructions ● Receive large project as smaller tasks with individual deadlines ● Work or take a test in a different setting, such as a quiet room with few distractions ● Sit where they learn best (for example, near the teacher) ● Use an alarm to help with time management ● Work with a partner ● Print out larger versions of text and diagrams to ensure visibility is not a barrier. ● Word bank/definitions available for remembering the different theories of ethics	● If students are struggling with starting models, use guiding questions. ● Use a graphic organizer to categorize concepts. ● Provide an outline for research and design tasks. ● Provide extended time for written responses and reports. ● Incorporate student choice ● Provide peer mentoring to improve techniques ● Use effort and achievement rubrics ● Assure students they can be successful ● Allow students many opportunities for practice and learning ● Use scaffolding for complex tasks See MLL, point 1.	● Encourage students to work on advanced requirements or higher achievement levels, when applicable. ● Offer choices of assignments to further content knowledge, once finished with a basic task, with personal interest being the key. ● Further evaluate the multiple ways ethical decisions are defended (theories of ethics)

Science, Ethics, Technology, & Society**Unit 2: Beginning of Life Issues****Related Phenomena:** De-Extinction & the Science of Cloning Living Things

Discuss the ethical considerations (financial, environmental, biological) of using reproductive cloning technologies to bring extinct species back to life. Students will eventually write a position paper explaining their opinion on the usefulness of this technology and argue whether cloning should be used to bring species back from extinction. They will once again be asking relevant questions, collecting facts, identifying stakeholders, and creating strong arguments for or against the use of this science in our society.

- **Driving Questions:** Should humans use technology at their disposal to reverse the natural course of Earth's life cycle? What if the extinction was man made?
- [De-Extinction: Can the Woolly Mammoth & Dodo Bird Restore our Ecosystem?](#) - Colossal Biosciences YouTube

Pacing: 3-4 weeks (approximately 12-16 classes)**New Jersey Student Learning Standards (NJSLs)**

HS-ETS1-1: Analyze a major global challenge to specify qualitative and quantitative criteria and constraints for solutions that account for societal needs and wants.

HS-ETS1-3: Evaluate a solution to a complex real-world problem based on prioritized criteria and trade-offs that account for a range of constraints, including cost, safety, reliability, and aesthetics as well as possible social, cultural, and environmental impacts.

HS-LS1-4: Use a model to illustrate the role of cellular division (mitosis) and differentiation in producing and maintaining complex organisms.

HS-LS3-1: Ask questions to clarify relationships about the role of DNA and chromosomes in coding the instructions for characteristic traits passed from parents to offspring.

HS-ESS3-4: Evaluate or refine a technological solution that reduces impacts of human activities on natural systems.

Science & Engineering Practices	Disciplinary Core Ideas	Cross-Cutting Concepts
Asking Questions and Defining Problems • Ask questions that arise from examining models or a theory to clarify relationships. • Analyze complex real-world problems by specifying criteria and constraints for successful solutions. Constructing Explanations and Designing Solutions • Design or refine a solution to a complex real-world problem based on scientific knowledge, student-generated sources of evidence, prioritized criteria, and tradeoff considerations. • Evaluate a solution to a complex real-world problem, based on scientific	ESS3.C: Human Impacts on Earth Systems • Scientists and engineers can make major contributions by developing technologies that produce less pollution and waste and that preclude ecosystem degradation. ETS1.A: Defining and Delimiting Engineering Problems • Criteria and constraints also include satisfying any requirements set by society, such as taking issues of risk mitigation into account, and they should be quantified to the extent possible and stated in such a way that one can tell if a given design meets them. • Humanity faces major global challenges today, such as the need for supplies of clean water and food or for energy sources that minimize pollution,	Asking Questions and Defining Problems • Analyze complex real-world problems by specifying criteria and constraints for successful solutions. Cause and Effect • Empirical evidence is required to differentiate between cause and correlation and make claims about specific causes and effects. Stability and Change • Feedback (negative or positive) can stabilize or destabilize a system. Systems and System Models

knowledge, student-generated sources of evidence, prioritized criteria, and tradeoff considerations.

Developing and Using Models

- Use a model based on evidence to illustrate the relationships between systems or between components of systems.

which can be addressed through engineering. These global challenges also may have manifestations in local communities.

ETS1.B: Developing Possible Solutions

- When evaluating solutions, it is important to take into account a range of constraints, including cost, safety, reliability, and aesthetics, and to consider social, cultural, and environmental impacts.

LS1.A: Structure and Function

- All cells contain genetic information in the form of DNA molecules. Genes are regions in the DNA that contain the instructions that code for the formation of proteins.

LS1.B: Growth and Development of Organisms

- In multicellular organisms individual cells grow and then divide via a process called mitosis, thereby allowing the organism to grow. The organism begins as a single cell (fertilized egg) that divides successively to produce many cells, with each parent cell passing identical genetic material (two variants of each chromosome pair) to both daughter cells. Cellular division and differentiation produce and maintain a complex organism, composed of systems of tissues and organs that work together to meet the needs of the whole organism.

LS3.A: Inheritance of Traits

- Each chromosome consists of a single very long DNA molecule, and each gene on the chromosome is a particular segment of that DNA. The instructions for forming species' characteristics are carried in DNA. All cells in an organism have the same genetic content, but the genes used (expressed) by the cell may be regulated in different ways. Not all DNA codes for a protein; some segments of DNA are involved in regulatory or structural functions, and some have no as-yet known function.

- Models (e.g., physical, mathematical, computer models) can be used to simulate systems and interactions — including energy, matter, and information flows — within and between systems at different scales.

Connections to Engineering, Technology, and Applications of Science

Influence of Science, Engineering, and Technology on Society and the Natural World

- Engineers continuously modify these technological systems by applying scientific knowledge and engineering design practices to increase benefits while decreasing costs and risks.
- New technologies can have deep impacts on society and the environment, including some that were not anticipated. Analysis of costs and benefits is a critical aspect of decisions about technology.

Essential Questions	Student Learning Objectives	Suggested Tasks/Activities	Evidence of Learning (Assessment)
- Do all people have the undeniable right to reproduce? - When rights conflict (mother/fetus) who should prevail? - Are all people created equal? - To what extent should technology interfere with/be used in creating life?	Student will be able to: - Identify and describe the components of the model illustrating the role of mitosis and differentiation in a multi-cellular organism - Define genetic engineering and genetic manipulation of the fetus - Define maternal/fetal conflict and use ethical theories to help decide If both cannot survive, who lives? - Identify and describe various technological assisted reproduction (TAR) options (In-vitro, sperm/egg donation, embryo storage, surrogate motherhood) - Explain the potential positives, negatives, and controversies of stem cell and fetal tissue research - Describe the impact of the introduction and subsequent removal of Roe vs Wade on women's rights - Identify gender preferences/# of children laws in various countries throughout the world - Describe the differences between therapeutic and reproductive cloning - Explain the ethical dilemmas associated with the reproductive cloning of humans and other species - Describe the obligation of the health insurance system in providing for assisted reproduction and the cost of treating premature babies	- Partake in the analysis of various case studies that simulate ethical questions that pertain to unit topics (TAR, cloning, , - Watch <i>GATTACA</i> to stimulate genetic manipulation of fetus discussion and how society could be altered due to use of that technology being regulated differently - Discuss the rights of women in a pre/post Roe vs Wade America from a purely health and wellness/scientific standpoint - Identify the players involved in technological assisted reproduction and interview one person involved (OB-GYN, woman who had in-vitro, healthcare provider, etc) and present findings to the class - Discuss the issues, counseling, and decisions that need to be made regarding a couple whose child may have a genetic disorder - Identify the different types of stem cells and the role stem cells play in cell differentiation through a webquest - Create a model showing how mitosis, meiosis, and cell differentiation are connected through the cloning process of living things - Watch clips from the movie <i>The Island</i> to stimulate cloning discussion - After completing independent research at home about what makes us human, organize and carry-out a formal debate on whether clones are independent humans or property of the cloned individual - Write a paper describing the science behind de-extinction as well as identifying the companies that are	- Homework, quizzes, tests, lab activities, projects, presentations, webquests, and case studies as decided by individual teachers - Evaluate student discussions and solutions to ethical issues/case studies using a modified version of the Colorado School of Mines rubrics (see resources for link) - genetic engineering - TAR - Cloning - Complete first position paper - Use a rubric to evaluate the explanation of the science behind de-extinction and the evidence and reasoning supporting their claim on whether it should be done.

	both in the short and long term • Explain how ultrasound is used to screen embryos and the ethical dilemmas parents face due to the results of the screening • Explain the science behind CRISPR technology and how it can be used to modify the genetic sequence of an organism	specializing in it and then explain your position on whether it should be allowed.	
Interdisciplinary Connections	• RI.CR.11–12.1: Accurately cite a range of thorough textual evidence and make relevant connections to strongly support a comprehensive analysis of multiple aspects of what an informational text says explicitly and inferentially, as well as interpretations of the text. • RI.MF.11–12.6: Synthesize complex information across multiple sources and formats to develop ideas, resolve conflicting information, or develop an interpretation that goes beyond explicit text information (e.g., express a personal point of view, new interpretation of the concept). • RI.CT.11–12.8: Analyze and reflect on (e.g., practical knowledge, historical/cultural context, and background knowledge) documents of historical and scientific significance for their purposes, including primary source documents relevant to U.S. and/or global history and texts proposing scientific or technical advancements. • W.AW.11–12.1: Write arguments to support claims in an analysis of substantive topics or texts, using valid reasoning and relevant and sufficient evidence. • SL.PE.11–12.1: Initiate and participate effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with peers on grades 11–12 topics, texts, and issues, building on others' ideas and expressing their own clearly and persuasively. • SL.II.11–12.2: Integrate multiple sources of information presented in diverse formats and media (e.g., visually, quantitatively, orally) in order to make informed decisions and solve problems, evaluating the credibility and accuracy of each source and noting any discrepancies among the data. • SL.PI.11–12.4: Present information, findings and supporting evidence clearly, concisely, and logically. The content, organization, development, and style are appropriate to task, purpose, and audience. • 1.5.12prof.Cn10a: Document the process of developing ideas from early stages to fully elaborated ideas. • F.IF.B.6: Calculate and interpret the average rate of change of a function (presented symbolically or as a table) over a specified interval. Estimate the rate of change from a graph.		
Career Readiness, Life Literacies, and Key Skills	• 9.1.12.FP.5: Evaluate how behavioral bias (e.g., overconfidence, confirmation, recency, loss aversion, etc.) affects decision-making.		

	● 9.2.12.CAP.3: Investigate how continuing education contributes to one's career and personal growth. ● 9.4.12.CI.1: Demonstrate the ability to reflect, analyze, and use creative skills and ideas. ● 9.4.12.DC.3: Evaluate the social and economic implications of privacy in the context of safety, law, or ethics (e.g., 6.3.12.HistoryCA.1).
Computer Science and Design Thinking	● 8.1.12.DA.5: Create data visualizations from large data sets to summarize, communicate, and support different interpretations of real-world phenomena. ● 8.1.12.IC.3: Predict the potential impacts and implications of emerging technologies on larger social, economic, and political structures, using evidence from credible sources. ● 8.2.12.EC.3: Synthesize data, analyze trends, and draw conclusions regarding the effect of a technology on the individual, culture, society, and environment and share this information with the appropriate audience.

Modifications

Multi-Lingual Learners	Students with Special Needs	At-Risk	Gifted and Talented
● Give multilingual learners with lower reading proficiency the option of focusing on the diagrams and animations, but encourage them to closely read a paragraph or two of the longer texts, so they practice and better comprehend the details shared by you and their classmates. ● Using classroom routines (such as <i>Domino Discover</i>) provides support for multilingual learners to provide different types of input, all from peers in the classroom, to students' language development. ● Allow student access to translation services such as Google Translate or PaperPal ● When possible, modify assignments so the ELL student writes less, has simpler questions to answer, fewer spelling words, etc.	● Use scaffolds, such as prompting ● Provide extended time for written responses and reports. ● Use a graphic organizer to categorize concepts. ● Get a written list of instructions ● Receive large project as smaller tasks with individual deadlines ● Work or take a test in a different setting, such as a quiet room with few distractions ● Sit where they learn best (for example, near the teacher) ● Use an alarm to help with time management ● Work with a partner ● Print out larger versions of text and diagrams to ensure visibility is not a barrier.	● If students are struggling with starting models, use guiding questions. ● Use a graphic organizer to categorize concepts. ● Provide an outline for research and design tasks. ● Provide extended time for written responses and reports. ● Incorporate student choice ● Provide peer mentoring to improve techniques ● Use effort and achievement rubrics ● Assure students they can be successful ● Allow students many opportunities for practice and learning ● Use scaffolding for complex tasks See MLL, point 1.	● Encourage students to work on advanced requirements or higher achievement levels, when applicable. ● Offer choices of assignments to further content knowledge, once finished with a basic task, with personal interest being the key. ● Further evaluate the science behind the cloning procedures and identify the times in history that ethical hearings were held due to people going too far with their research.

• Provide models of completed homework assignments, projects, etc. • Assign a native language partner. • Provide extended time for written responses and reports.	• Word bank/definitions available for remembering the different theories of ethics • Chunk the formal presentation into manageable steps and provide revision of the position paper		
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Science, Ethics, Technology, & Society**Unit 3: Organ and Tissue Acquisition****Related Phenomena:** Global Kidney Trade

Students will be introduced to the legal acquisition of organs, specifically kidneys, in the United States which is based on a voluntary donation model. This model contains legislation that safeguards donors' health and ensures mandatory informed consent is provided. Students will then be introduced to the "Red Market" for organs where donors are taken advantage of and are offered money in exchange for their organs. Students will highlight the stark differences between the two models and evaluate the pros and cons of each.

- **Driving Question:** Does a person have the right to do whatever they choose with their own organs?
- [The Global Organ Trafficking Network](#) - DW Documentary YouTube Channel (Deutsche Welle Broadcasting Company)

Pacing: 3 weeks (approximately 12 classes)**New Jersey Student Learning Standards (NJSLs)**

HS-ETS1-1: Analyze a major global challenge to specify qualitative and quantitative criteria and constraints for solutions that account for societal needs and wants.

HS-ETS1-3: Evaluate a solution to a complex real-world problem based on prioritized criteria and trade-offs that account for a range of constraints, including cost, safety, reliability, and aesthetics as well as possible social, cultural, and environmental impacts.

Science & Engineering Practices	Disciplinary Core Ideas	Cross-Cutting Concepts
Asking Questions and Defining Problems - Analyze complex real-world problems by specifying criteria and constraints for successful solutions. Constructing Explanations and Designing Solutions - Evaluate a solution to a complex real-world problem, based on scientific knowledge, student-generated sources of evidence, prioritized criteria, and tradeoff considerations.	ETS1.A: Defining and Delimiting Engineering Problems - Criteria and constraints also include satisfying any requirements set by society, such as taking issues of risk mitigation into account, and they should be quantified to the extent possible and stated in such a way that one can tell if a given design meets them. - Humanity faces major global challenges today, such as the need for supplies of clean water and food or for energy sources that minimize pollution, which can be addressed through engineering. These global challenges also may have manifestations in local communities. ETS1.B: Developing Possible Solutions - When evaluating solutions, it is important to take into account a range of constraints, including cost, safety, reliability, and aesthetics, and to consider social, cultural, and environmental impacts.	Asking Questions and Defining Problems - Analyze complex real-world problems by specifying criteria and constraints for successful solutions. ----- Connections to Engineering, Technology, and Applications of Science Influence of Science, Engineering, and Technology on Society and the Natural World - New technologies can have deep impacts on society and the environment, including some that were not anticipated. Analysis of costs and benefits is a critical aspect of decisions about technology.

Essential Questions	Student Learning Objectives	Suggested Tasks/Activities	Evidence of Learning (Assessment)
- Who owns your body? - Should capitalism and the free market control the flow of organs? - Once removed, are your cells still yours?	Student will be able to: - Analyze a major global problem by describing the challenge with a rationale for why it is a major global challenge, describing the extent and depth of the problem and the consequences to society on both global and local levels - Identify the system in which the problem exists and specify qualitative and quantitative criteria and constraints for developing acceptable solutions to the problem. - Find the need and availability of human organs through the National Organ Donor Registry - Explain the role of capitalism in organ donation: sale vs donation - Research and explore whether the sale of organs will develop a tiered system: rich vs poor, haves vs have-nots - Identify the frequency and role of coercion in donating an organ to a family member - Research the illegal trade of organs/human tissue on the "Red Market" from both legal and illegal sources - Describe whether status and celebrity move a person up the donor list – Is there a level playing field? - Identify and explain human instances of indentured servitude and human	- Watch videos on human trafficking and find/present examples of local human exploitation - Read <i>The Immortal Life of Henrietta Lacks</i> and answer guided study questions for each chapter - Research different positions of obtaining organs via donation, sale, or illegal means and create a video used to inform the public of what is happening around the world - Research The Bodies Exhibit – Where do the bodies come from? Is this science or entertainment? Write a personal reflection on the matter. - Research and present finds on the legal cases of John Moore, Havasupai Indians, and Greenberg vs Miami Children's Hospital regarding lack of rights over cells - Read excerpts from the books <i>Red Market</i> and <i>The Body Brokers</i> - Potential guest speaker on the process of organ and body donation in the state of NJ	- Homework, quizzes, tests, lab activities, projects, presentations, webquests, and case studies as decided by individual teachers - Evaluate the quizzes on book excerpts - Evaluate student videos on the Global Red Market (see resources for rubric link) - Evaluate the presentations on the legal battles (see resources for rubric) - Evaluate the Bodies Exhibit position paper (see resources for rubric)

	- trafficking - Compare and contrast legal decisions as to who owns your body (Henrietta Lacks, John Moore, Greenberg vs Miami Children's Hospital, Havasupai Indians)		
Interdisciplinary Connections	RI.CR.11–12.1: Accurately cite a range of thorough textual evidence and make relevant connections to strongly support a comprehensive analysis of multiple aspects of what an informational text says explicitly and inferentially, as well as interpretations of the text. RI.MF.11–12.6: Synthesize complex information across multiple sources and formats to develop ideas, resolve conflicting information, or develop an interpretation that goes beyond explicit text information (e.g., express a personal point of view, new interpretation of the concept). RI.CT.11–12.8: Analyze and reflect on (e.g., practical knowledge, historical/cultural context, and background knowledge) documents of historical and scientific significance for their purposes, including primary source documents relevant to U.S. and/or global history and texts proposing scientific or technical advancements. W.AW.11–12.1: Write arguments to support claims in an analysis of substantive topics or texts, using valid reasoning and relevant and sufficient evidence. SL.PE.11–12.1: Initiate and participate effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with peers on grades 11–12 topics, texts, and issues, building on others' ideas and expressing their own clearly and persuasively. SL.II.11–12.2: Integrate multiple sources of information presented in diverse formats and media (e.g., visually, quantitatively, orally) in order to make informed decisions and solve problems, evaluating the credibility and accuracy of each source and noting any discrepancies among the data. SL.PI.11–12.4: Present information, findings and supporting evidence clearly, concisely, and logically. The content, organization, development, and style are appropriate to task, purpose, and audience. 1.5.12prof.Cn10a: Document the process of developing ideas from early stages to fully elaborated ideas.		
Career Readiness, Life Literacies, and Key Skills	9.1.12.FP.5: Evaluate how behavioral bias (e.g., overconfidence, confirmation, recency, loss aversion, etc.) affects decision-making. 9.2.12.CAP.3: Investigate how continuing education contributes to one's career and personal growth. 9.4.12.CI.1: Demonstrate the ability to reflect, analyze, and use creative skills and ideas. 9.4.12.CT.4: Participate in online strategy and planning sessions for course-based, school-based, or other projects and determine the strategies that contribute to effective outcomes.		

	● 9.4.12.DC.3: Evaluate the social and economic implications of privacy in the context of safety, law, or ethics (e.g., 6.3.12.HistoryCA.1).		
Computer Science and Design Thinking	● 8.1.12.DA.5: Create data visualizations from large data sets to summarize, communicate, and support different interpretations of real-world phenomena. ● 8.1.12.IC.3: Predict the potential impacts and implications of emerging technologies on larger social, economic, and political structures, using evidence from credible sources. ● 8.2.12.EC.1: Analyze controversial technological issues and determine the degree to which individuals, businesses, and governments have an ethical role in decisions that are made. ● 8.2.12.EC.2: Assess the positive and negative impacts of emerging technologies on developing countries and evaluate how individuals, non-profit organizations, and governments have responded. ● 8.2.12.EC.3: Synthesize data, analyze trends, and draw conclusions regarding the effect of a technology on the individual, culture, society, and environment and share this information with the appropriate audience.		
Modifications			
Multi-Lingual Learners	Students with Special Needs	At-Risk	Gifted and Talented
● Give multilingual learners with lower reading proficiency the option of focusing on the diagrams and animations, but encourage them to closely read a paragraph or two of the longer texts, so they practice and better comprehend the details shared by you and their classmates. ● Using classroom routines (such as <i>Domino Discover</i>) provides support for multilingual learners to provide different types of input, all from peers in the classroom, to students' language development. ● Allow student access to translation services such as Google Translate or PaperPal ● When possible, modify assignments so the ELL student writes less, has simpler questions to answer, fewer spelling words, etc.	● Use scaffolds, such as prompting ● Provide extended time for written responses and reports. ● Use a graphic organizer to categorize concepts. ● Get a written list of instructions ● Receive large project as smaller tasks with individual deadlines ● Work or take a test in a different setting, such as a quiet room with few distractions ● Sit where they learn best (for example, near the teacher) ● Use an alarm to help with time management ● Work with a partner	● If students are struggling with starting models, use guiding questions. ● Use a graphic organizer to categorize concepts. ● Provide an outline for research and design tasks. ● Provide extended time for written responses and reports. ● Incorporate student choice ● Provide peer mentoring to improve techniques ● Use effort and achievement rubrics ● Assure students they can be successful ● Allow students many opportunities for practice and learning ● Use scaffolding for complex tasks See MLL, point 1.	● Encourage students to work on advanced requirements or higher achievement levels, when applicable. ● Offer choices of assignments to further content knowledge, once finished with a basic task, with personal interest being the key. ● Further research the links between socioeconomic locations and an increase in organ and human trafficking.

• Provide models of completed homework assignments, projects, etc. • Assign a native language partner. • Provide extended time for written responses and reports.	• Print out larger versions of text and diagrams to ensure visibility is not a barrier. • Word bank/definitions available for remembering the different theories of ethics • Chunk the formal presentation into manageable steps and provide revision of the position paper		
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Science, Ethics, Technology, & Society**Unit 4: Human Experimentation****Related Phenomena:** Tuskegee Syphilis Study

Students will be introduced to this study, conducted from 1932 to 1972 by the U.S. Public Health Service. The study involved impoverished African American men in rural Alabama, some of which had syphilis and others did not. The researchers told the men they were being treated for "bad blood," a local term for various ailments. In reality, the men with syphilis were not treated, even after penicillin became the standard and effective treatment for the disease in the 1940s. The researchers wanted to observe the natural progression of the disease, and they actively prevented the men from accessing treatment. The study was only stopped in 1972 after a public outcry.

- **Driving Question:** Is information that will benefit many people worth acquiring at the expense of a few?
- [The Tuskegee Syphilis Study](#) - US Centers for Disease Control and Prevention (CDC.gov)

Pacing: 3 weeks (approximately 12 classes)

New Jersey Student Learning Standards (NJSLs)

HS-ETS1-1: Analyze a major global challenge to specify qualitative and quantitative criteria and constraints for solutions that account for societal needs and wants.

HS-ETS1-3: Evaluate a solution to a complex real-world problem based on prioritized criteria and trade-offs that account for a range of constraints, including cost, safety, reliability, and aesthetics as well as possible social, cultural, and environmental impacts.

Science & Engineering Practices	Disciplinary Core Ideas	Cross-Cutting Concepts
Asking Questions and Defining Problems - Analyze complex real-world problems by specifying criteria and constraints for successful solutions. Constructing Explanations and Designing Solutions - Evaluate a solution to a complex real-world problem, based on scientific knowledge, student-generated sources of evidence, prioritized criteria, and tradeoff considerations.	ETS1.A: Defining and Delimiting Engineering Problems - Criteria and constraints also include satisfying any requirements set by society, such as taking issues of risk mitigation into account, and they should be quantified to the extent possible and stated in such a way that one can tell if a given design meets them. - Humanity faces major global challenges today, such as the need for supplies of clean water and food or for energy sources that minimize pollution, which can be addressed through engineering. These global challenges also may have manifestations in local communities. ETS1.B: Developing Possible Solutions - When evaluating solutions, it is important to take into account a range of constraints, including cost, safety, reliability, and aesthetics, and to consider social, cultural, and environmental impacts.	Asking Questions and Defining Problems - Analyze complex real-world problems by specifying criteria and constraints for successful solutions. ----- Connections to Engineering, Technology, and Applications of Science Influence of Science, Engineering, and Technology on Society and the Natural World - New technologies can have deep impacts on society and the environment, including some that were not anticipated. Analysis of costs and benefits is a critical aspect of decisions about technology.

Essential Questions	Student Learning Objectives	Suggested Tasks/Activities	Evidence of Learning (Assessment)
- What are the acceptable boundaries of human experimentation? - Where do we draw the line between a necessary sacrifice for the greater good and a violation of an individual's rights? - Can a person who is impoverished, incarcerated, or facing a life-threatening illness ever truly give free and uncoerced consent to participate in a medical experiment, or are they inherently vulnerable to exploitation?	Student will be able to: - Analyze a major global problem by describing the challenge with a rationale for why it is a major global challenge, describing the extent and depth of the problem and the consequences to society on both global and local levels - Identify the system in which the problem exists and specify qualitative and quantitative criteria and constraints for developing acceptable solutions to the problem. - Detail the human experimentation done by Nazi scientist/doctors during WWII and why it led to the formation of the Nuremberg Code - Explain the Nuremberg Code's guidelines for human experimentation - Identify examples of humans as research subjects from before and after the development of the Nuremberg Code - Defend the opinion on whether the use of involuntary research subjects such as prisoners, POWs, concentration camp people is right - Defend their opinion regarding whether prisoners should be able to participate in studies in exchange for leniency - Explain the different phases of clinical trials performed in the USA and why each is important. - Identify the rules in place for people to participate in clinical trials	- Discuss the documentary – <i>Acres of Skin</i> on the experimentation of prisoners at Holmesburg Prison - Complete a case study or a formal debate arguing for and against experiments performed on prisoners - Research and present one example of a scientific advance that was the result of involuntary human experimentation - Identify the advances that came out of Nazi Era Germany – Should these findings be accepted by the scientific community/general public? - Research experiments that were run after the development of the Nuremberg Code, but failed to follow the guidelines - Discuss the ethics of using double blind and placebo experiments on people that are terminal - Use the NIH site to identify current clinical trials being run in the United States - Research the laws that govern clinical trials in the United States and then design your own clinical trial	- Homework, quizzes, tests, lab activities, projects, presentations, webquests, and case studies as decided by individual teachers - Evaluate the case study or formal debate on prisoner's rights - Evaluate student videos on the Global Red Market (see resources for rubric link) - Evaluate the presentations on breakthroughs made via involuntary experimentation (see resources for rubric) - Evaluate the Clinical Trial project (see resources for rubric)
Interdisciplinary Connections			

	• RI.CR.11–12.1: Accurately cite a range of thorough textual evidence and make relevant connections to strongly support a comprehensive analysis of multiple aspects of what an informational text says explicitly and inferentially, as well as interpretations of the text. • RI.MF.11–12.6: Synthesize complex information across multiple sources and formats to develop ideas, resolve conflicting information, or develop an interpretation that goes beyond explicit text information (e.g., express a personal point of view, new interpretation of the concept). • RI.CT.11–12.8: Analyze and reflect on (e.g., practical knowledge, historical/cultural context, and background knowledge) documents of historical and scientific significance for their purposes, including primary source documents relevant to U.S. and/or global history and texts proposing scientific or technical advancements. • W.AW.11–12.1: Write arguments to support claims in an analysis of substantive topics or texts, using valid reasoning and relevant and sufficient evidence. • SL.PE.11–12.1: Initiate and participate effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with peers on grades 11–12 topics, texts, and issues, building on others' ideas and expressing their own clearly and persuasively. • SL.II.11–12.2: Integrate multiple sources of information presented in diverse formats and media (e.g., visually, quantitatively, orally) in order to make informed decisions and solve problems, evaluating the credibility and accuracy of each source and noting any discrepancies among the data. • SL.PI.11–12.4: Present information, findings and supporting evidence clearly, concisely, and logically. The content, organization, development, and style are appropriate to task, purpose, and audience. • 1.5.12prof.Cn10a: Document the process of developing ideas from early stages to fully elaborated ideas.
Career Readiness, Life Literacies, and Key Skills	• 9.1.12.FP.5: Evaluate how behavioral bias (e.g., overconfidence, confirmation, recency, loss aversion, etc.) affects decision-making. • 9.2.12.CAP.3: Investigate how continuing education contributes to one's career and personal growth. • 9.4.12.CI.1: Demonstrate the ability to reflect, analyze, and use creative skills and ideas. • 9.4.12.CT.4: Participate in online strategy and planning sessions for course-based, school-based, or other projects and determine the strategies that contribute to effective outcomes. • 9.4.12.DC.3: Evaluate the social and economic implications of privacy in the context of safety, law, or ethics (e.g., 6.3.12.HistoryCA.1).
Computer Science and Design Thinking	• 8.1.12.DA.5: Create data visualizations from large data sets to summarize, communicate, and support different interpretations of real-world phenomena. • 8.1.12.IC.3: Predict the potential impacts and implications of emerging technologies on larger social, economic, and political structures, using evidence from credible sources.

	● 8.2.12.EC.1: Analyze controversial technological issues and determine the degree to which individuals, businesses, and governments have an ethical role in decisions that are made. ● 8.2.12.EC.2: Assess the positive and negative impacts of emerging technologies on developing countries and evaluate how individuals, non-profit organizations, and governments have responded. ● 8.2.12.EC.3: Synthesize data, analyze trends, and draw conclusions regarding the effect of a technology on the individual, culture, society, and environment and share this information with the appropriate audience.		
Modifications			
Multi-Lingual Learners	Students with Special Needs	At-Risk	Gifted and Talented
● Give multilingual learners with lower reading proficiency the option of focusing on the diagrams and animations, but encourage them to closely read a paragraph or two of the longer texts, so they practice and better comprehend the details shared by you and their classmates. ● Using classroom routines (such as <i>Domino Discover</i>) provides support for multilingual learners to provide different types of input, all from peers in the classroom, to students' language development. ● Allow student access to translation services such as Google Translate or PaperPal ● When possible, modify assignments so the ELL student writes less, has simpler questions to answer, fewer spelling words, etc. ● Provide models of completed homework assignments, projects, etc. ● Assign a native language partner. ● Provide extended time for written responses and reports.	● Use scaffolds, such as prompting ● Provide extended time for written responses and reports. ● Use a graphic organizer to categorize concepts. ● Get a written list of instructions ● Receive large project as smaller tasks with individual deadlines ● Work or take a test in a different setting, such as a quiet room with few distractions ● Sit where they learn best (for example, near the teacher) ● Use an alarm to help with time management ● Work with a partner ● Print out larger versions of text and diagrams to ensure visibility is not a barrier. ● Word bank/definitions available for remembering the different theories of ethics ● Chunk the formal debate (if done) into manageable steps and provide revision of the clinical trial project	● If students are struggling with starting models, use guiding questions. ● Use a graphic organizer to categorize concepts. ● Provide an outline for research and design tasks. ● Provide extended time for written responses and reports. ● Incorporate student choice ● Provide peer mentoring to improve techniques ● Use effort and achievement rubrics ● Assure students they can be successful ● Allow students many opportunities for practice and learning ● Use scaffolding for complex tasks See MLL, point 1.	● Encourage students to work on advanced requirements or higher achievement levels, when applicable. ● Offer choices of assignments to further content knowledge, once finished with a basic task, with personal interest being the key. ● Complete a full cascade of clinical trials for the project, showing progression through the different phases and sample data that would be collected from each phase of the trial.

Science, Ethics, Technology, & Society**Unit 5: Animal Rights & Welfare****Related Phenomena:** Tuskegee Syphilis Study

Students will be introduced to this study, conducted from 1932 to 1972 by the U.S. Public Health Service. The study involved impoverished African American men in rural Alabama, some of which had syphilis and others did not. The researchers told the men they were being treated for "bad blood," a local term for various ailments. In reality, the men with syphilis were not treated, even after penicillin became the standard and effective treatment for the disease in the 1940s. The researchers wanted to observe the natural progression of the disease, and they actively prevented the men from accessing treatment. The study was only stopped in 1972 after a public outcry.

- **Driving Question:** Is information that will benefit many people worth acquiring at the expense of a few?
- [The Tuskegee Syphilis Study](#) - US Centers for Disease Control and Prevention (CDC.gov)

Pacing: 3 weeks (approximately 12 classes)

New Jersey Student Learning Standards (NJSLs)

HS-ETS1-1: Analyze a major global challenge to specify qualitative and quantitative criteria and constraints for solutions that account for societal needs and wants.

HS-ETS1-3: Evaluate a solution to a complex real-world problem based on prioritized criteria and trade-offs that account for a range of constraints, including cost, safety, reliability, and aesthetics as well as possible social, cultural, and environmental impacts.

HS-LS2-7: Design, evaluate, and refine a solution for reducing the impacts of human activities on the environment and biodiversity.

Science & Engineering Practices	Disciplinary Core Ideas	Cross-Cutting Concepts
Asking Questions and Defining Problems - Analyze complex real-world problems by specifying criteria and constraints for successful solutions. Constructing Explanations and Designing Solutions - Design, evaluate, and refine a solution to a complex real-world problem, based on scientific knowledge, student-generated sources of evidence, prioritized criteria, and tradeoff considerations. - Evaluate a solution to a complex real-world problem, based on scientific knowledge, student-generated sources of evidence, prioritized criteria, and tradeoff considerations.	ETS1.A: Defining and Delimiting Engineering Problems - Criteria and constraints also include satisfying any requirements set by society, such as taking issues of risk mitigation into account, and they should be quantified to the extent possible and stated in such a way that one can tell if a given design meets them. - Humanity faces major global challenges today, such as the need for supplies of clean water and food or for energy sources that minimize pollution, which can be addressed through engineering. These global challenges also may have manifestations in local communities. ETS1.B: Developing Possible Solutions - When evaluating solutions, it is important to take into account a range of constraints, including cost,	Asking Questions and Defining Problems - Analyze complex real-world problems by specifying criteria and constraints for successful solutions. Stability and Change - Much of science deals with constructing explanations of how things change and how they remain stable. Connections to Engineering, Technology, and Applications of Science Influence of Science, Engineering, and Technology on Society and the Natural World - New technologies can have deep impacts on society and the

	safety, reliability, and aesthetics, and to consider social, cultural, and environmental impacts. LS2.C: Ecosystem Dynamic, Functioning, and Resilience - Moreover, anthropogenic changes (induced by human activity) in the environment — including habitat destruction, pollution, introduction of invasive species, overexploitation, and climate change — can disrupt an ecosystem and threaten the survival of some species. LS4.D: Biodiversity and Humans - Humans depend on the living world for the resources and other benefits provided by biodiversity. But human activity is also having adverse impacts on biodiversity through overpopulation, overexploitation, habitat destruction, pollution, introduction of invasive species, and climate change. Thus sustaining biodiversity so that ecosystem functioning and productivity are maintained is essential to supporting and enhancing life on Earth. Sustaining biodiversity also aids humanity by preserving landscapes of recreational or inspirational value.	environment, including some that were not anticipated. Analysis of costs and benefits is a critical aspect of decisions about technology.
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Essential Questions	Student Learning Objectives	Suggested Tasks/Activities	Evidence of Learning (Assessment)
- Should animals have the same rights as people? - Is it acceptable to keep/display animals for human entertainment? - Are all animals created equal? - Do humans have the right and obligation to aid in the preservation of local and global biodiversity?	Student will be able to: - Analyze a major global problem by describing the challenge with a rationale for why it is a major global challenge, describing the extent and depth of the problem and the consequences to society on both global and local levels - Identify the system in which	- Investigate the history of animal protection in the US (ASPCA) and discuss when we moved from animal welfare to animal rights - Determine the efficacy of PETA marketing campaigns - Develop a PETA style anti or pro animal research PSA - Write a position paper discussing the differences between animal rights and welfare and which	- Homework, quizzes, tests, lab activities, projects, presentations, webquests, and case studies as decided by individual teachers - Evaluate the position paper on animal rights and welfare (see resources for rubric link) - Evaluate student PETA

	the problem exists and specify qualitative and quantitative criteria and constraints for developing acceptable solutions to the problem. • Design, evaluate, and refine a solution that involves reducing the negative effects of human activities on the environment and biodiversity • Clarify the differences between animal rights and animal welfare • Identify when passionate protesting becomes domestic terrorism – PETA, ALF • Identify the stance of the American Medical Association on animal research • Identify the laws in place for using animals as research subjects • Define and elaborate on the ethics of non-survival surgery conducted by veterinary schools • Explain the new technologies that are being developed to minimize the number of experiments requiring animal test subjects • Describe the roles of zoos and aquariums as both entertainment and species preservation • Explain whether circuses are entertainment or abuse • Clarify who determines which animals are suitable/worthy to save given money and resources (tiger vs spider, elephant vs mosquito, etc.) • Explain what happens when human and animal	• Investigate the history of circuses and personal ownership of “wild” animals • Research and present advances that were made through animal research and discuss non-animal testing technologies currently being used - Are computer simulations or tissue culture acceptable replacements? • Research and design a modern enclosure for a zoo or aquarium that is designed to minimize human impact on local biodiversity while maximizing the welfare of the animals	style PSAs (see resources for rubric link) • Evaluate the presentations on modern non-animal testing technologies (see resources for rubric) • Evaluate the Zoo Enclosure project (see resources for rubric)
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	- populations conflict - Identify the pros and cons of using animals for research purposes		
Interdisciplinary Connections	RI.CR.11–12.1: Accurately cite a range of thorough textual evidence and make relevant connections to strongly support a comprehensive analysis of multiple aspects of what an informational text says explicitly and inferentially, as well as interpretations of the text. RI.MF.11–12.6: Synthesize complex information across multiple sources and formats to develop ideas, resolve conflicting information, or develop an interpretation that goes beyond explicit text information (e.g., express a personal point of view, new interpretation of the concept). RI.CT.11–12.8: Analyze and reflect on (e.g., practical knowledge, historical/cultural context, and background knowledge) documents of historical and scientific significance for their purposes, including primary source documents relevant to U.S. and/or global history and texts proposing scientific or technical advancements. W.AW.11–12.1: Write arguments to support claims in an analysis of substantive topics or texts, using valid reasoning and relevant and sufficient evidence. SL.PE.11–12.1: Initiate and participate effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with peers on grades 11–12 topics, texts, and issues, building on others' ideas and expressing their own clearly and persuasively. SL.II.11–12.2: Integrate multiple sources of information presented in diverse formats and media (e.g., visually, quantitatively, orally) in order to make informed decisions and solve problems, evaluating the credibility and accuracy of each source and noting any discrepancies among the data. SL.PI.11–12.4: Present information, findings and supporting evidence clearly, concisely, and logically. The content, organization, development, and style are appropriate to task, purpose, and audience. 1.5.12prof.Cn10a: Document the process of developing ideas from early stages to fully elaborated ideas.		
Career Readiness, Life Literacies, and Key Skills	9.1.12.FP.5: Evaluate how behavioral bias (e.g., overconfidence, confirmation, recency, loss aversion, etc.) affects decision-making. 9.2.12.CAP.3: Investigate how continuing education contributes to one's career and personal growth. 9.4.12.CI.1: Demonstrate the ability to reflect, analyze, and use creative skills and ideas. 9.4.12.CT.4: Participate in online strategy and planning sessions for course-based, school-based, or other projects and determine the strategies that contribute to effective outcomes. 9.4.12.DC.3: Evaluate the social and economic implications of privacy in the context of safety, law, or ethics (e.g., 6.3.12.HistoryCA.1).		
Computer Science and Design Thinking			

	● 8.1.12.DA.5: Create data visualizations from large data sets to summarize, communicate, and support different interpretations of real-world phenomena. ● 8.1.12.IC.3: Predict the potential impacts and implications of emerging technologies on larger social, economic, and political structures, using evidence from credible sources. ● 8.2.12.EC.3: Synthesize data, analyze trends, and draw conclusions regarding the effect of a technology on the individual, culture, society, and environment and share this information with the appropriate audience.		
Modifications			
Multi-Lingual Learners	Students with Special Needs	At-Risk	Gifted and Talented
● Give multilingual learners with lower reading proficiency the option of focusing on the diagrams and animations, but encourage them to closely read a paragraph or two of the longer texts, so they practice and better comprehend the details shared by you and their classmates. ● Using classroom routines (such as <i>Domino Discover</i>) provides support for multilingual learners to provide different types of input, all from peers in the classroom, to students' language development. ● Allow student access to translation services such as Google Translate or PaperPal ● When possible, modify assignments so the ELL student writes less, has simpler questions to answer, fewer spelling words, etc. ● Provide models of completed homework assignments, projects, etc. ● Assign a native language partner. ● Provide extended time for written responses and reports.	● Use scaffolds, such as prompting ● Provide extended time for written responses and reports. ● Use a graphic organizer to categorize concepts. ● Get a written list of instructions ● Receive large project as smaller tasks with individual deadlines ● Work or take a test in a different setting, such as a quiet room with few distractions ● Sit where they learn best (for example, near the teacher) ● Use an alarm to help with time management ● Work with a partner ● Print out larger versions of text and diagrams to ensure visibility is not a barrier. ● Word bank/definitions available for remembering the different theories of ethics ● Chunk the formal presentation into manageable steps and provide revision of the	● If students are struggling with starting models, use guiding questions. ● Use a graphic organizer to categorize concepts. ● Provide an outline for research and design tasks. ● Provide extended time for written responses and reports. ● Incorporate student choice ● Provide peer mentoring to improve techniques ● Use effort and achievement rubrics ● Assure students they can be successful ● Allow students many opportunities for practice and learning ● Use scaffolding for complex tasks See MLL, point 1.	● Encourage students to work on advanced requirements or higher achievement levels, when applicable. ● Offer choices of assignments to further content knowledge, once finished with a basic task, with personal interest being the key. ● While researching modern technologies that do not require animal testing, identify companies that have embraced these models and some of their products that have been developed without animal testing.

	position paper and zoo enclosure project		
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Science, Ethics, Technology, & Society**Unit 6: End of Life Issues****Related Phenomena:** Karen Ann Quinlan

Students will learn about Karen Ann Quinlan and the ensuing legal battle between doctors and her family regarding the right to refuse life prolonging treatment. Karen was a young woman who fell into a persistent vegetative state after she stopped breathing at a party. Doctors believed she would not recover and was being kept alive by a ventilator. Her parents requested that the ventilator be removed, believing it was an unnatural extension of her life. The hospital and her doctors refused, citing medical ethics and the fear of a murder charge.

- **Driving Question:** When a person can no longer speak for themselves, who should have the authority to decide if and when to end life-sustaining medical treatment, and what factors should guide that decision?
- **[Dying With Dignity: The Case That Changed Dying](#)** - Karen Ann Quinlan Memorial Foundation (KarenAnnQuinlanHospice.org)

Pacing: 2 weeks (approximately 8 classes)**New Jersey Student Learning Standards (NJSLS)**

HS-ETS1-1: Analyze a major global challenge to specify qualitative and quantitative criteria and constraints for solutions that account for societal needs and wants.

HS-ETS1-3: Evaluate a solution to a complex real-world problem based on prioritized criteria and trade-offs that account for a range of constraints, including cost, safety, reliability, and aesthetics as well as possible social, cultural, and environmental impacts.

Science & Engineering Practices	Disciplinary Core Ideas	Cross-Cutting Concepts
Asking Questions and Defining Problems - Analyze complex real-world problems by specifying criteria and constraints for successful solutions. Constructing Explanations and Designing Solutions - Evaluate a solution to a complex real-world problem, based on scientific knowledge, student-generated sources of evidence, prioritized criteria, and tradeoff considerations.	ETS1.A: Defining and Delimiting Engineering Problems - Criteria and constraints also include satisfying any requirements set by society, such as taking issues of risk mitigation into account, and they should be quantified to the extent possible and stated in such a way that one can tell if a given design meets them. - Humanity faces major global challenges today, such as the need for supplies of clean water and food or for energy sources that minimize pollution, which can be addressed through engineering. These global challenges also may have manifestations in local communities. ETS1.B: Developing Possible Solutions - When evaluating solutions, it is important to take into account a range of constraints, including cost, safety, reliability, and aesthetics, and to consider social, cultural, and environmental impacts.	Asking Questions and Defining Problems - Analyze complex real-world problems by specifying criteria and constraints for successful solutions. Connections to Engineering, Technology, and Applications of Science Influence of Science, Engineering, and Technology on Society and the Natural World - New technologies can have deep impacts on society and the environment, including some that were not anticipated. Analysis of costs and benefits is a critical aspect of decisions about technology.

Essential Questions	Student Learning Objectives	Suggested Tasks/Activities	Evidence of Learning (Assessment)
- Who owns a patient's life and death? Is it the patient, their family, the doctor, or the law? - What is the difference between prolonging life and prolonging the dying process? - How do we define "quality of life" in a way that respects a person's dignity, and who is qualified to make that judgment? - When resources like healthcare professionals, hospital beds, and advanced technology are limited, does society have an obligation to provide every available treatment, regardless of the patient's prognosis?	Student will be able to: - Analyze a major global problem by describing the challenge with a rationale for why it is a major global challenge, describing the extent and depth of the problem and the consequences to society on both global and local levels - Identify the system in which the problem exists and specify qualitative and quantitative criteria and constraints for developing acceptable solutions to the problem. - Determine the cultural, legal, and historical basis of what constitutes life and death - Identify who Dr. Jack Kevorkian was, what his contribution to society was, and what laws were written as a result of his work - Describe whether individuals have the right to determine when/how they die - Explain the role of hospice and palliative care in end of life issues - Identify all legal issues around "pulling the plug" and removing nutritional support from people in persistent vegetative states (Teri Schiavo, Karen Ann Quindlan) - Define DNR/advanced directive - Describe the history of the death penalty in the United States and identify the factors that determine whether a	- Partake in the analysis of case studies that simulate ethical questions that pertain to unit topics – vary the argument for each (not all pro/against) - Position paper or formal debate on physician-assisted suicide and/or the death penalty - Watch a video on the creation of Frankenstein's monster and discuss whether the monster is alive/dead - Research and write a response identifying the US laws that are on the books regarding euthanasia and removal of nutritional support - Complete a timeline showing the historical changes of the death penalty in the United States - OPTIONAL: Interview their parents/grandparents about whether they would want/have a DNR? What would they consider to be extraordinary life saving procedures?	- Homework, quizzes, tests, lab activities, projects, presentations, webquests, and case studies as decided by individual teachers - Evaluate the position paper or formal debate on the death penalty/PAS - Evaluate student responses on euthanasia laws in the USA (see resources for rubric link)

	criminal receives the death penalty (Is justice truly blind?)	
Interdisciplinary Connections	• RI.CR.11–12.1: Accurately cite a range of thorough textual evidence and make relevant connections to strongly support a comprehensive analysis of multiple aspects of what an informational text says explicitly and inferentially, as well as interpretations of the text. • RI.MF.11–12.6: Synthesize complex information across multiple sources and formats to develop ideas, resolve conflicting information, or develop an interpretation that goes beyond explicit text information (e.g., express a personal point of view, new interpretation of the concept). • RI.CT.11–12.8: Analyze and reflect on (e.g., practical knowledge, historical/cultural context, and background knowledge) documents of historical and scientific significance for their purposes, including primary source documents relevant to U.S. and/or global history and texts proposing scientific or technical advancements. • W.AW.11–12.1: Write arguments to support claims in an analysis of substantive topics or texts, using valid reasoning and relevant and sufficient evidence. • SL.PE.11–12.1: Initiate and participate effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with peers on grades 11–12 topics, texts, and issues, building on others' ideas and expressing their own clearly and persuasively. • SL.II.11–12.2: Integrate multiple sources of information presented in diverse formats and media (e.g., visually, quantitatively, orally) in order to make informed decisions and solve problems, evaluating the credibility and accuracy of each source and noting any discrepancies among the data. • SL.PI.11–12.4: Present information, findings and supporting evidence clearly, concisely, and logically. The content, organization, development, and style are appropriate to task, purpose, and audience. • 1.5.12prof.Cn10a: Document the process of developing ideas from early stages to fully elaborated ideas.	
Career Readiness, Life Literacies, and Key Skills	• 9.1.12.FP.5: Evaluate how behavioral bias (e.g., overconfidence, confirmation, recency, loss aversion, etc.) affects decision-making. • 9.2.12.CAP.3: Investigate how continuing education contributes to one's career and personal growth. • 9.4.12.CI.1: Demonstrate the ability to reflect, analyze, and use creative skills and ideas. • 9.4.12.CT.4: Participate in online strategy and planning sessions for course-based, school-based, or other projects and determine the strategies that contribute to effective outcomes. • 9.4.12.DC.3: Evaluate the social and economic implications of privacy in the context of safety, law, or ethics (e.g., 6.3.12.HistoryCA.1).	
Computer Science and Design Thinking	• 8.1.12.DA.5: Create data visualizations from large data sets to summarize, communicate, and support different interpretations of real-world phenomena.	

	● 8.1.12.IC.3: Predict the potential impacts and implications of emerging technologies on larger social, economic, and political structures, using evidence from credible sources. ● 8.2.12.EC.3: Synthesize data, analyze trends, and draw conclusions regarding the effect of a technology on the individual, culture, society, and environment and share this information with the appropriate audience.		
Modifications			
Multi-Lingual Learners	Students with Special Needs	At-Risk	Gifted and Talented
● Give multilingual learners with lower reading proficiency the option of focusing on the diagrams and animations, but encourage them to closely read a paragraph or two of the longer texts, so they practice and better comprehend the details shared by you and their classmates. ● Using classroom routines (such as <i>Domino Discover</i>) provides support for multilingual learners to provide different types of input, all from peers in the classroom, to students' language development. ● Allow student access to translation services such as Google Translate or PaperPal ● When possible, modify assignments so the ELL student writes less, has simpler questions to answer, fewer spelling words, etc. ● Provide models of completed homework assignments, projects, etc. ● Assign a native language partner. ● Provide extended time for written responses and reports.	● Use scaffolds, such as prompting ● Provide extended time for written responses and reports. ● Use a graphic organizer to categorize concepts. ● Get a written list of instructions ● Receive large project as smaller tasks with individual deadlines ● Work or take a test in a different setting, such as a quiet room with few distractions ● Sit where they learn best (for example, near the teacher) ● Use an alarm to help with time management ● Work with a partner ● Print out larger versions of text and diagrams to ensure visibility is not a barrier. ● Word bank/definitions available for remembering the different theories of ethics ● Chunk the formal debate (if done) into manageable steps and provide revision of the position paper	● If students are struggling with starting models, use guiding questions. ● Use a graphic organizer to categorize concepts. ● Provide an outline for research and design tasks. ● Provide extended time for written responses and reports. ● Incorporate student choice ● Provide peer mentoring to improve techniques ● Use effort and achievement rubrics ● Assure students they can be successful ● Allow students many opportunities for practice and learning ● Use scaffolding for complex tasks See MLL, point 1.	● Encourage students to work on advanced requirements or higher achievement levels, when applicable. ● Offer choices of assignments to further content knowledge, once finished with a basic task, with personal interest being the key. ● Research which countries have legalized "Death with Dignity" Acts and how that law is being obeyed and regulated.

Science, Ethics, Technology, & Society		
Unit 7: Public Health & Global Population		
Related Phenomena: The Silver Tsunami Students will learn about the phenomenon called “The Silver Tsunami” which is the increase in older populations from a percentage standpoint. The increase in older populations leads to a higher demand for healthcare and housing costs that must be supplemented by the community and current working force. Students will then discuss how the make-up and health of a population directly affects all aspects of that population’s life and whether it is the responsibility of leaders to control what they can to better the entire population. • Driving Question: How does the structure of a population influence its health, and to what extent can governments ethically regulate individual choices to shape this structure? • What is the Silver Tsunami? - LifeNoggin YouTube Channel		
Pacing: 2-3 weeks (approximately 8 -12 classes) New Jersey Student Learning Standards (NJSLS) HS-ETS1-1: Analyze a major global challenge to specify qualitative and quantitative criteria and constraints for solutions that account for societal needs and wants. HS-ETS1-3: Evaluate a solution to a complex real-world problem based on prioritized criteria and trade-offs that account for a range of constraints, including cost, safety, reliability, and aesthetics as well as possible social, cultural, and environmental impacts. HS-LS2-1: Use mathematical and/or computational representations to support explanations of factors that affect carrying capacity of ecosystems at different scales.		
Science & Engineering Practices	Disciplinary Core Ideas	Cross-Cutting Concepts
Asking Questions and Defining Problems • Analyze complex real-world problems by specifying criteria and constraints for successful solutions. Constructing Explanations and Designing Solutions • Evaluate a solution to a complex real-world problem, based on scientific knowledge, student-generated sources of evidence, prioritized criteria, and tradeoff considerations. Using Mathematics and Computational Thinking • Use mathematical and/or computational representations of phenomena or design solutions to support explanations.	ETS1.A: Defining and Delimiting Engineering Problems • Criteria and constraints also include satisfying any requirements set by society, such as taking issues of risk mitigation into account, and they should be quantified to the extent possible and stated in such a way that one can tell if a given design meets them. • Humanity faces major global challenges today, such as the need for supplies of clean water and food or for energy sources that minimize pollution, which can be addressed through engineering. These global challenges also may have manifestations in local communities. ETS1.B: Developing Possible Solutions • When evaluating solutions, it is important to take into account a range of constraints, including cost, safety, reliability, and aesthetics, and to consider social, cultural, and environmental impacts.	Asking Questions and Defining Problems • Analyze complex real-world problems by specifying criteria and constraints for successful solutions. Scale, Proportion, and Quantity • The significance of a phenomenon is dependent on the scale, proportion, and quantity at which it occurs. Connections to Engineering, Technology, and Applications of Science Influence of Science, Engineering, and Technology on Society and the Natural World • New technologies can have deep impacts on society and the environment, including some that were not anticipated. Analysis of

LS2.A: Interdependent Relationships in Ecosystems

- Ecosystems have carrying capacities, which are limits to the numbers of organisms and populations they can support. These limits result from such factors as the availability of living and nonliving resources and from such challenges such as predation, competition, and disease. Organisms would have the capacity to produce populations of great size were it not for the fact that environments and resources are finite. This fundamental tension affects the abundance (number of individuals) of species in any given ecosystem.

costs and benefits is a critical aspect of decisions about technology.

Essential Questions	Student Learning Objectives	Suggested Tasks/Activities	Evidence of Learning (Assessment)
- How much individual freedom should be sacrificed for the health and safety of the community? - What are our ethical obligations to address health inequalities, both locally and globally? - How do societies make ethical decisions under the extreme pressure of a public health crisis, and who guides these choices? - Can the Earth sustain a growing human population? - What are the ethical responsibilities of individuals and nations in managing global resources?	Student will be able to: - Analyze a major global problem by describing the challenge with a rationale for why it is a major global challenge, describing the extent and depth of the problem and the consequences to society on both global and local levels - Identify the system in which the problem exists and specify qualitative and quantitative criteria and constraints for developing acceptable solutions to the problem. - Create and use mathematical and/or computational representations (e.g., trends, averages, histograms, graphs, spreadsheets) of ecosystem factors to identify changes over time in the numbers and types of organisms in ecosystems of different scales. - Determine the differences between populations in the	- Investigate and graph the history of the worldwide population – What factors have contributed to the massive population boom in the last 100 years? - Identify the projected carrying capacity of earth, when it will be met, and the impact people would have on our planet if that population was achieved - Select one type of population control (war, plague, natural disasters, etc) and present how that situation impacted worldwide population - Research cultural gender preferences and how those preferences have skewed populations - Investigate what factors keep populations in check (education, wealth, etc) and which factors have the potential to destabilize communities in the future - Analyze population pyramids for	- Homework, quizzes, tests, lab activities, projects, presentations, webquests, and case studies as decided by individual teachers - Evaluate the formal debate on the chosen topic (see resources for rubric link) - Evaluate student graphing of global population and their ability to infer information from population pyramids

	developed world vs 3rd world and agrarian and technological societies • Explain how wars, plagues, and pandemics control population • Identify the impact of child birthing laws on population and evaluate the legal and ethical arguments for them being in place • Explain if the government should set targets for population increase/decrease • Explain whether water shortages will destabilize communities, populations, and governments in the future. • Analyze population pyramids to understand age and gender distribution, and predict a population's future growth and challenges. • Connect population demographics to public health needs like healthcare and education. • Define and discuss the concept of global human carrying capacity, including the different perspectives and controversies. • Analyze the relationship between future growth of the human population and the availability of resources like food, water, and energy. • Evaluate the ethical responsibilities of wealthy nations toward developing nations in the context of resource use and population growth. • Understand the ethical challenges present in maintaining good global health	different countries and infer their economic status, potential challenges (e.g., "youth bulge" or aging population), and healthcare needs. • Assign students roles as delegates from different countries (e.g., a low-income country with a rapidly growing population vs. a high-income country with a shrinking population) to negotiate a global resource-sharing treaty. • Complete a formal debate on one of the following: - o The primary responsibility for addressing climate change and resource scarcity falls on nations with the highest per capita consumption, not those with the highest population growth. - o The rights of the government to enact laws that directly influence family size for the good of the nation.	
Interdisciplinary Connections			

	• RI.CR.11–12.1: Accurately cite a range of thorough textual evidence and make relevant connections to strongly support a comprehensive analysis of multiple aspects of what an informational text says explicitly and inferentially, as well as interpretations of the text. • RI.MF.11–12.6: Synthesize complex information across multiple sources and formats to develop ideas, resolve conflicting information, or develop an interpretation that goes beyond explicit text information (e.g., express a personal point of view, new interpretation of the concept). • RI.CT.11–12.8: Analyze and reflect on (e.g., practical knowledge, historical/cultural context, and background knowledge) documents of historical and scientific significance for their purposes, including primary source documents relevant to U.S. and/or global history and texts proposing scientific or technical advancements. • W.AW.11–12.1: Write arguments to support claims in an analysis of substantive topics or texts, using valid reasoning and relevant and sufficient evidence. • SL.PE.11–12.1: Initiate and participate effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with peers on grades 11–12 topics, texts, and issues, building on others' ideas and expressing their own clearly and persuasively. • SL.II.11–12.2: Integrate multiple sources of information presented in diverse formats and media (e.g., visually, quantitatively, orally) in order to make informed decisions and solve problems, evaluating the credibility and accuracy of each source and noting any discrepancies among the data. • SL.PI.11–12.4: Present information, findings and supporting evidence clearly, concisely, and logically. The content, organization, development, and style are appropriate to task, purpose, and audience. • 1.5.12prof.Cn10a: Document the process of developing ideas from early stages to fully elaborated ideas.
Career Readiness, Life Literacies, and Key Skills	• 9.1.12.FP.5: Evaluate how behavioral bias (e.g., overconfidence, confirmation, recency, loss aversion, etc.) affects decision-making. • 9.2.12.CAP.3: Investigate how continuing education contributes to one's career and personal growth. • 9.4.12.CI.1: Demonstrate the ability to reflect, analyze, and use creative skills and ideas. • 9.4.12.CT.4: Participate in online strategy and planning sessions for course-based, school-based, or other projects and determine the strategies that contribute to effective outcomes. • 9.4.12.DC.3: Evaluate the social and economic implications of privacy in the context of safety, law, or ethics (e.g., 6.3.12.HistoryCA.1).
Computer Science and Design Thinking	• 8.1.12.DA.5: Create data visualizations from large data sets to summarize, communicate, and support different interpretations of real-world phenomena. • 8.1.12.IC.3: Predict the potential impacts and implications of emerging technologies on larger social, economic, and political structures, using evidence from credible sources.

	● 8.2.12.EC.1: Analyze controversial technological issues and determine the degree to which individuals, businesses, and governments have an ethical role in decisions that are made. ● 8.2.12.EC.2: Assess the positive and negative impacts of emerging technologies on developing countries and evaluate how individuals, non-profit organizations, and governments have responded. ● 8.2.12.EC.3: Synthesize data, analyze trends, and draw conclusions regarding the effect of a technology on the individual, culture, society, and environment and share this information with the appropriate audience.		
Modifications			
Multi-Lingual Learners	Students with Special Needs	At-Risk	Gifted and Talented
● Give multilingual learners with lower reading proficiency the option of focusing on the diagrams and animations, but encourage them to closely read a paragraph or two of the longer texts, so they practice and better comprehend the details shared by you and their classmates. ● Using classroom routines (such as <i>Domino Discover</i>) provides support for multilingual learners to provide different types of input, all from peers in the classroom, to students' language development. ● Allow student access to translation services such as Google Translate or PaperPal ● When possible, modify assignments so the ELL student writes less, has simpler questions to answer, fewer spelling words, etc. ● Provide models of completed homework assignments, projects, etc. ● Assign a native language partner. ● Provide extended time for written responses and reports.	● Use scaffolds, such as prompting ● Provide extended time for written responses and reports. ● Use a graphic organizer to categorize concepts. ● Get a written list of instructions ● Receive large project as smaller tasks with individual deadlines ● Work or take a test in a different setting, such as a quiet room with few distractions ● Sit where they learn best (for example, near the teacher) ● Use an alarm to help with time management ● Work with a partner ● Print out larger versions of text and diagrams to ensure visibility is not a barrier. ● Word bank/definitions available for remembering the different theories of ethics ● Chunk the formal debate into manageable steps and provide revision of the position paper	● If students are struggling with starting models, use guiding questions. ● Use a graphic organizer to categorize concepts. ● Provide an outline for research and design tasks. ● Provide extended time for written responses and reports. ● Incorporate student choice ● Provide peer mentoring to improve techniques ● Use effort and achievement rubrics ● Assure students they can be successful ● Allow students many opportunities for practice and learning ● Use scaffolding for complex tasks See MLL, point 1.	● Encourage students to work on advanced requirements or higher achievement levels, when applicable. ● Offer choices of assignments to further content knowledge, once finished with a basic task, with personal interest being the key. ● Design public health policy for the United States to follow in the event of another pandemic. Use experiences from the COVID-19 pandemic to help develop your plan.

Science, Ethics, Technology, & Society		
Unit 8: Climate & Environmental Concerns		
Related Phenomena: Rising Sea Levels Students will use the NOAA simulation to see the drastic changes to our global shorelines that will occur as seas levels rise from 1-10 feet. Students will then discuss what causes the sea levels to rise and what other effects those causes could have on our lives and the environment. Finally, students will discuss the impacts that a rise in sea levels would have on global population, economy, and general human welfare. • Driving Question: At what point does human ingenuity have to take a back seat to environmental factors? • Rising Sea Levels Simulation - NOAA (National Oceanic and Atmospheric Association)		
Pacing: 3 weeks (approximately 12 classes) New Jersey Student Learning Standards (NJSLs) HS-ETS1-1: Analyse a major global challenge to specify qualitative and quantitative criteria and constraints for solutions that account for societal needs and wants. HS-ETS1-2: Design a solution to a complex real-world problem by breaking it down into smaller, more manageable problems that can be solved through engineering. HS-ETS1-3: Evaluate a solution to a complex real-world problem based on prioritized criteria and trade-offs that account for a range of constraints, including cost, safety, reliability, and aesthetics as well as possible social, cultural, and environmental impacts. HS-ESS3-1: Construct an explanation based on evidence for how the availability of natural resources, occurrence of natural hazards, and changes in climate have influenced human activity. HS-ESS3-3: Create a computational simulation to illustrate the relationships among management of natural resources, the sustainability of human populations, and biodiversity. HS-ESS3-4: Evaluate or refine a technological solution that reduces impacts of human activities on natural systems. HS-ESS3-5: Analyze geoscience data and the results from global climate models to make an evidence-based forecast of the current rate of global or regional climate change and associated future impacts to Earth systems. HS-LS2-6: Evaluate the claims, evidence, and reasoning that the complex interactions in ecosystems maintain relatively consistent numbers and types of organisms in stable conditions, but changing conditions may result in a new ecosystem.		
Science & Engineering Practices	Disciplinary Core Ideas	Cross-Cutting Concepts
Asking Questions and Defining Problems • Analyze data using computational models in order to make valid and reliable scientific claims. • Analyze complex real-world problems by specifying criteria and constraints for successful solutions. Constructing Explanations and Designing Solutions • Construct an explanation based on valid and reliable evidence obtained from a	ESS3.A: Natural Resources • Resource availability has guided the development of human society. ESS3.B: Natural Hazards • Natural hazards and other geologic events have shaped the course of human history; [they] have significantly altered the sizes of human populations and have driven human migrations. ESS3.C: Human Impacts on Earth Systems	Asking Questions and Defining Problems • Analyze complex real-world problems by specifying criteria and constraints for successful solutions. Cause and Effect • Empirical evidence is required to differentiate between cause and correlation and make claims about specific causes and effects. Stability and Change

variety of sources (including students' own investigations, models, theories, simulations, peer review) and the assumption that theories and laws that describe the natural world operate today as they did in the past and will continue to do so in the future. - Design or refine a solution to a complex real-world problem based on scientific knowledge, student-generated sources of evidence, prioritized criteria, and tradeoff considerations. - Evaluate a solution to a complex real-world problem, based on scientific knowledge, student-generated sources of evidence, prioritized criteria, and tradeoff considerations. Engaging in Argument from Evidence - Evaluate the claims, evidence, and reasoning behind currently accepted explanations or solutions to determine the merits of arguments. Using Mathematics and Computational Thinking - Create a computational model or simulation of a phenomenon, designed device, process, or system. Connections to Nature of Science Scientific Investigations Use a Variety of Methods - Science investigations use diverse methods and do not always use the same set of procedures to obtain data. - New technologies advance scientific knowledge. Scientific Knowledge is Based on Empirical Evidence	- Scientists and engineers can make major contributions by developing technologies that produce less pollution and waste and that preclude ecosystem degradation. - The sustainability of human societies and the biodiversity that supports them requires responsible management of natural resources. ESS3.D: Global Climate Change - Though the magnitudes of human impacts are greater than they have ever been, so too are human abilities to model, predict, and manage current and future impacts. ETS1.A: Defining and Delimiting Engineering Problems - Criteria and constraints also include satisfying any requirements set by society, such as taking issues of risk mitigation into account, and they should be quantified to the extent possible and stated in such a way that one can tell if a given design meets them. - Humanity faces major global challenges today, such as the need for supplies of clean water and food or for energy sources that minimize pollution, which can be addressed through engineering. These global challenges also may have manifestations in local communities. ETS1.B: Developing Possible Solutions - When evaluating solutions, it is important to take into account a range of constraints, including cost, safety, reliability, and aesthetics, and to consider social, cultural, and environmental impacts. ETS1.C: Optimizing the Design Solution - Criteria may need to be broken down into simpler ones that can be approached systematically, and decisions about the priority of certain criteria over others (tradeoffs) may be needed. LS2.C: Ecosystem Dynamics, Functioning, and Resilience	- Change and rates of change can be quantified and modeled over very short or very long periods of time. Some system changes are irreversible. - Feedback (negative or positive) can stabilize or destabilize a system. - Much of science deals with constructing explanations of how things change and how they remain stable. Connections to Engineering, Technology, and Applications of Science Influence of Science, Engineering, and Technology on Society and the Natural World - Engineers continuously modify these technological systems by applying scientific knowledge and engineering design practices to increase benefits while decreasing costs and risks. - Modern civilization depends on major technological systems. - New technologies can have deep impacts on society and the environment, including some that were not anticipated. Analysis of costs and benefits is a critical aspect of decisions about technology. Connections to Nature of Science Science is a Human Endeavor - Science is a result of human endeavors, imagination, and creativity.
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- Science knowledge is based on empirical evidence. - Science arguments are strengthened by multiple lines of evidence supporting a single explanation. Scientific Knowledge is Open to Revision in Light of New Evidence - Scientific argumentation is a mode of logical discourse used to clarify the strength of relationships between ideas and evidence that may result in revision of an explanation.	A complex set of interactions within an ecosystem can keep its numbers and types of organisms relatively constant over long periods of time under stable conditions. If a modest biological or physical disturbance to an ecosystem occurs, it may return to its more or less original status (i.e., the ecosystem is resilient), as opposed to becoming a very different ecosystem. Extreme fluctuations in conditions or the size of any population, however, can challenge the functioning of ecosystems in terms of resources and habitat availability.		
Essential Questions	Student Learning Objectives	Suggested Tasks/Activities	Evidence of Learning (Assessment)
- Do technological advances negatively impact the environment more than they positively impact our society? - Will there always be communities left behind with the advent of new technology? - Is there a tipping point from which the environment can not recover?	Student will be able to: - Analyze a major global problem by describing the challenge with a rationale for why it is a major global challenge, describing the extent and depth of the problem and the consequences to society on both global and local levels - Identify the system in which the problem exists and specify qualitative and quantitative criteria and constraints for developing acceptable solutions to the problem. - Identify the top environmental issues facing our population - Explain how climate change is impacting the geosphere and identify ways humans can hope to reverse the changes. - Analyze the effectiveness of pro-environment messaging from the last 50 years - Explain whether there is a	- Research and rank the top environmental issues identified in this article in order of level of concern for people and present the findings to the class - Use the NASA and NRDC websites to research the data supporting climate change - Read “The Lorax” and watch pro-environment PSAs from the last 5 decades and evaluate the efficacy of the messaging. - Develop a paper on the politics behind toxic waste disposal OR the link between cell towers and cancer clusters - Complete a major research project covering alternative energy sources, calculating energy costs, and evaluating the long term cost and benefits of implementing AES for residential power.	- Homework, quizzes, tests, lab activities, projects, presentations, webquests, and case studies as decided by individual teachers - Evaluate the presentations on the top environmental issues (see resources for rubric link) - Evaluate student paper on topic of their choice (see resources for rubric link) - Evaluate the AES research project (see resources for rubric link)

	correlation between cancer and high energy transformer towers. • Identify and describe the Superfund toxic cleanup sites • Research the technology, history, pros, and cons of the following alternative energy sources (AES) - geothermal, nuclear, wind, solar, and hydroelectricity • Research and calculate the energy cost of a typical home powered by oil/natural gas electrical plants • Research and calculate the energy cost of a typical home powered by the 5 AES • Complete a cost/benefit analysis for changing from a traditional source of power to an AES		
Interdisciplinary Connections	• RI.CR.11–12.1: Accurately cite a range of thorough textual evidence and make relevant connections to strongly support a comprehensive analysis of multiple aspects of what an informational text says explicitly and inferentially, as well as interpretations of the text. • RI.MF.11–12.6: Synthesize complex information across multiple sources and formats to develop ideas, resolve conflicting information, or develop an interpretation that goes beyond explicit text information (e.g., express a personal point of view, new interpretation of the concept). • RI.CT.11–12.8: Analyze and reflect on (e.g., practical knowledge, historical/cultural context, and background knowledge) documents of historical and scientific significance for their purposes, including primary source documents relevant to U.S. and/or global history and texts proposing scientific or technical advancements. • W.AW.11–12.1: Write arguments to support claims in an analysis of substantive topics or texts, using valid reasoning and relevant and sufficient evidence. • SL.PE.11–12.1: Initiate and participate effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with peers on grades 11–12 topics, texts, and issues, building on others' ideas and expressing their own clearly and persuasively. • SL.II.11–12.2: Integrate multiple sources of information presented in diverse formats and media (e.g., visually, quantitatively, orally) in order to make informed decisions and solve problems, evaluating the credibility and accuracy of each source and noting any discrepancies among the data.		

	● SL.PI.11–12.4: Present information, findings and supporting evidence clearly, concisely, and logically. The content, organization, development, and style are appropriate to task, purpose, and audience. ● 1.5.12prof.Cn10a: Document the process of developing ideas from early stages to fully elaborated ideas.		
Career Readiness, Life Literacies, and Key Skills	● 9.1.12.FP.5: Evaluate how behavioral bias (e.g., overconfidence, confirmation, recency, loss aversion, etc.) affects decision-making. ● 9.2.12.CAP.3: Investigate how continuing education contributes to one's career and personal growth. ● 9.4.12.CI.1: Demonstrate the ability to reflect, analyze, and use creative skills and ideas. ● 9.4.12.CT.4: Participate in online strategy and planning sessions for course-based, school-based, or other projects and determine the strategies that contribute to effective outcomes. ● 9.4.12.DC.3: Evaluate the social and economic implications of privacy in the context of safety, law, or ethics (e.g., 6.3.12.HistoryCA.1).		
Computer Science and Design Thinking	● 8.1.12.DA.5: Create data visualizations from large data sets to summarize, communicate, and support different interpretations of real-world phenomena. ● 8.1.12.IC.3: Predict the potential impacts and implications of emerging technologies on larger social, economic, and political structures, using evidence from credible sources. ● 8.2.12.EC.1: Analyze controversial technological issues and determine the degree to which individuals, businesses, and governments have an ethical role in decisions that are made. ● 8.2.12.EC.2: Assess the positive and negative impacts of emerging technologies on developing countries and evaluate how individuals, non-profit organizations, and governments have responded. ● 8.2.12.EC.3: Synthesize data, analyze trends, and draw conclusions regarding the effect of a technology on the individual, culture, society, and environment and share this information with the appropriate audience.		
Modifications			
Multi-Lingual Learners	Students with Special Needs	At-Risk	Gifted and Talented
● Give multilingual learners with lower reading proficiency the option of focusing on the diagrams and animations, but encourage them to closely read a paragraph or two of the longer texts, so they practice and better comprehend the details shared by you and their classmates. ● Using classroom routines (such as <i>Domino Discover</i>) provides support for multilingual learners to	● Use scaffolds, such as prompting ● Provide extended time for written responses and reports. ● Use a graphic organizer to categorize concepts. ● Get a written list of instructions	● If students are struggling with starting models, use guiding questions. ● Use a graphic organizer to categorize concepts. ● Provide an outline for research and design tasks. ● Provide extended time for written responses and reports. ● Incorporate student choice	● Encourage students to work on advanced requirements or higher achievement levels, when applicable. ● Offer choices of assignments to further content knowledge, once finished with a basic task, with personal interest being the key.

provide different types of input, all from peers in the classroom, to students' language development. • Allow student access to translation services such as Google Translate or PaperPal • When possible, modify assignments so the ELL student writes less, has simpler questions to answer, fewer spelling words, etc. • Provide models of completed homework assignments, projects, etc. • Assign a native language partner. • Provide extended time for written responses and reports.	• Receive large project as smaller tasks with individual deadlines • Work or take a test in a different setting, such as a quiet room with few distractions • Sit where they learn best (for example, near the teacher) • Use an alarm to help with time management • Work with a partner • Print out larger versions of text and diagrams to ensure visibility is not a barrier. • Word bank/definitions available for remembering the different theories of ethics • Chunk the AES into manageable steps and provide revision of the position paper	• Provide peer mentoring to improve techniques • Use effort and achievement rubrics • Assure students they can be successful • Allow students many opportunities for practice and learning • Use scaffolding for complex tasks See MLL, point 1.	• Incorporate the climate change content into the AES project by identifying the improvements to the environment that switching to an AES would provide.
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Science, Ethics, Technology, & Society		
Unit 9: Science and Technology Through the Years		
Related Phenomena: What is technology? Students will be shown a variety of objects to determine if they are considered technology. The object will range from rocks to lawnmowers to artificial intelligence. A discussion will follow that all things that are used to solve problems or as tools are considered technology. • Driving Question: When does a simple object cross a threshold and be considered technology? • History of Technology - Britannica.com		
Pacing: 3 weeks (approximately 12 classes)		
New Jersey Student Learning Standards (NJSLs) HS-ETS1-1: Analyze a major global challenge to specify qualitative and quantitative criteria and constraints for solutions that account for societal needs and wants. HS-ETS1-3: Evaluate a solution to a complex real-world problem based on prioritized criteria and trade-offs that account for a range of constraints, including cost, safety, reliability, and aesthetics as well as possible social, cultural, and environmental impacts.		
Science & Engineering Practices	Disciplinary Core Ideas	Cross-Cutting Concepts
Asking Questions and Defining Problems • Analyze complex real-world problems by specifying criteria and constraints for successful solutions. Constructing Explanations and Designing Solutions • Construct an explanation based on valid and reliable evidence obtained from a variety of sources (including students' own investigations, models, theories, simulations, peer review) and the assumption that theories and laws that describe the natural world operate today as they did in the past and will continue to do so in the future. • Evaluate a solution to a complex real-world problem, based on scientific knowledge, student-generated sources of evidence, prioritized criteria, and tradeoff considerations.	ESS3.A: Natural Resources • Resource availability has guided the development of human society. ESS3.B: Natural Hazards • Natural hazards and other geologic events have shaped the course of human history; [they] have significantly altered the sizes of human populations and have driven human migrations. ETS1.A: Defining and Delimiting Engineering Problems • Criteria and constraints also include satisfying any requirements set by society, such as taking issues of risk mitigation into account, and they should be quantified to the extent possible and stated in such a way that one can tell if a given design meets them. • Humanity faces major global challenges today, such as the need for supplies of clean water and food or for energy sources that minimize pollution, which can be addressed through engineering.	Asking Questions and Defining Problems • Analyze complex real-world problems by specifying criteria and constraints for successful solutions. Cause and Effect • Empirical evidence is required to differentiate between cause and correlation and make claims about specific causes and effects. Connections to Engineering, Technology, and Applications of Science Influence of Science, Engineering, and Technology on Society and the Natural World • Modern civilization depends on major technological systems. • New technologies can have deep impacts on society and the environment, including some that

	These global challenges also may have manifestations in local communities. ETS1.B: Developing Possible Solutions When evaluating solutions, it is important to take into account a range of constraints, including cost, safety, reliability, and aesthetics, and to consider social, cultural, and environmental impacts.	were not anticipated. Analysis of costs and benefits is a critical aspect of decisions about technology.	
Essential Questions	Student Learning Objectives	Suggested Tasks/Activities	Evidence of Learning (Assessment)
- How have a few key technological shifts fundamentally changed the trajectory of human civilization? - How did 20th-century scientific breakthroughs set the stage for the world we live in today? - What are the most pressing scientific and technological challenges today, and who are the people leading the charge?	Student will be able to: - Analyze a major global problem by describing the challenge with a rationale for why it is a major global challenge, describing the extent and depth of the problem and the consequences to society on both global and local levels - Identify the system in which the problem exists and specify qualitative and quantitative criteria and constraints for developing acceptable solutions to the problem. - Identify and describe the major technological eras(Agricultural Revolution, Industrial Revolution, and Information Age) in human history. - Explain how specific scientific discoveries led to these historical eras. - Analyze the societal impact of each era, including economic, social, and cultural changes. - Define cyborg and identify modern example of them	- Create a timeline showing the technological eras of human history - Research a technological breakthrough from any of the historical eras and present how it still impacts today's society - Discuss the shift from studying classical to quantum physics, which led to inventions like the laser and the transistor. - Discuss the rapid advancements in AI, from autonomous vehicles to generative models. - Watch The Incredible Story of the First Human Cyborg and research other examples of human/machine interfaces - Formal debate about the pros and cons of artificial intelligence (AI bias, job displacement, and the potential for superintelligence) - Research a MODERN scientist, not discussed in class, and present why they have, or will, have a lasting impact on our society.	- Homework, quizzes, tests, lab activities, projects, presentations, webquests, and case studies as decided by individual teachers - Evaluate the formal debate on artificial intelligence (see resources for rubric link) - Evaluate presentation on modern scientist's impact on society (see resources for rubric link)

	- Identify the impact that the following discoveries and breakthroughs have had on society - DNA structure and genetics - Quantum Mechanics - Artificial Intelligence - Identify the life and accomplishments of the following scientists from various historical eras - Archimedes, Newton, Currie (pre-20th century) - Einstein, Franklin, Turing (20th Century) - Emmanuelle Charpentier, Jennifer Doudna, Geoffrey Hinton, Neil deGrasse Tyson, Craig Venter (modern)		
Interdisciplinary Connections	RI.CR.11–12.1: Accurately cite a range of thorough textual evidence and make relevant connections to strongly support a comprehensive analysis of multiple aspects of what an informational text says explicitly and inferentially, as well as interpretations of the text. RI.MF.11–12.6: Synthesize complex information across multiple sources and formats to develop ideas, resolve conflicting information, or develop an interpretation that goes beyond explicit text information (e.g., express a personal point of view, new interpretation of the concept). RI.CT.11–12.8: Analyze and reflect on (e.g., practical knowledge, historical/cultural context, and background knowledge) documents of historical and scientific significance for their purposes, including primary source documents relevant to U.S. and/or global history and texts proposing scientific or technical advancements. W.AW.11–12.1: Write arguments to support claims in an analysis of substantive topics or texts, using valid reasoning and relevant and sufficient evidence. SL.PE.11–12.1: Initiate and participate effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with peers on grades 11–12 topics, texts, and issues, building on others' ideas and expressing their own clearly and persuasively.		

	● SL.II.11–12.2: Integrate multiple sources of information presented in diverse formats and media (e.g., visually, quantitatively, orally) in order to make informed decisions and solve problems, evaluating the credibility and accuracy of each source and noting any discrepancies among the data. ● SL.PI.11–12.4: Present information, findings and supporting evidence clearly, concisely, and logically. The content, organization, development, and style are appropriate to task, purpose, and audience. ● 1.5.12prof.Cn10a: Document the process of developing ideas from early stages to fully elaborated ideas.		
Career Readiness, Life Literacies, and Key Skills	● 9.1.12.FP.5: Evaluate how behavioral bias (e.g., overconfidence, confirmation, recency, loss aversion, etc.) affects decision-making. ● 9.2.12.CAP.3: Investigate how continuing education contributes to one's career and personal growth. ● 9.4.12.CI.1: Demonstrate the ability to reflect, analyze, and use creative skills and ideas. ● 9.4.12.CT.4: Participate in online strategy and planning sessions for course-based, school-based, or other projects and determine the strategies that contribute to effective outcomes. ● 9.4.12.DC.3: Evaluate the social and economic implications of privacy in the context of safety, law, or ethics (e.g., 6.3.12.HistoryCA.1).		
Computer Science and Design Thinking	● 8.1.12.DA.5: Create data visualizations from large data sets to summarize, communicate, and support different interpretations of real-world phenomena. ● 8.1.12.IC.3: Predict the potential impacts and implications of emerging technologies on larger social, economic, and political structures, using evidence from credible sources. ● 8.2.12.EC.3: Synthesize data, analyze trends, and draw conclusions regarding the effect of a technology on the individual, culture, society, and environment and share this information with the appropriate audience.		
Modifications			
Multi-Lingual Learners	Students with Special Needs	At-Risk	Gifted and Talented
● Give multilingual learners with lower reading proficiency the option of focusing on the diagrams and animations, but encourage them to closely read a paragraph or two of the longer texts, so they practice and better comprehend the details shared by you and their classmates. ● Using classroom routines (such as <i>Domino Discover</i>) provides support for multilingual learners to provide different types of input, all	● Use scaffolds, such as prompting ● Provide extended time for written responses and reports. ● Use a graphic organizer to categorize concepts. ● Get a written list of instructions ● Receive large project as smaller tasks with individual deadlines	● If students are struggling with starting models, use guiding questions. ● Use a graphic organizer to categorize concepts. ● Provide an outline for research and design tasks. ● Provide extended time for written responses and reports. ● Incorporate student choice ● Provide peer mentoring to improve techniques	● Encourage students to work on advanced requirements or higher achievement levels, when applicable. ● Offer choices of assignments to further content knowledge, once finished with a basic task, with personal interest being the key. ● Research a topic of their choice that they feel has

from peers in the classroom, to students' language development. • Allow student access to translation services such as Google Translate or PaperPal • When possible, modify assignments so the ELL student writes less, has simpler questions to answer, fewer spelling words, etc. • Provide models of completed homework assignments, projects, etc. • Assign a native language partner. • Provide extended time for written responses and reports.	• Work or take a test in a different setting, such as a quiet room with few distractions • Sit where they learn best (for example, near the teacher) • Use an alarm to help with time management • Work with a partner • Print out larger versions of text and diagrams to ensure visibility is not a barrier. • Word bank/definitions available for remembering the different theories of ethics • Provide revision of the research paper on modern scientist's impact on society	• Use effort and achievement rubrics • Assure students they can be successful • Allow students many opportunities for practice and learning • Use scaffolding for complex tasks See MLL, point 1.	changed our society for the better and identify the person that invented or developed it.
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Science, Ethics, Technology, & Society**Unit 10: The Internet and Social Media's Impact on Society****Related Phenomena:** Screen Usage Analysis

Students will view the latest statistics showing average screen time globally and in the United States. We will then analyze our own current screen usage and debate the pros and cons of having unlimited information in the palms of our hands. Finally, students will discuss whether they feel like they have missed out on things in their life because of their dependence on their phones/screens.

- **Driving Question:** Are we as a society spending too much time staring at our screens and missing what's happening around us?
- [Average Screen Time Statistics](#) - Exploding Topics.com

Pacing: 3 weeks (approximately 8 classes)

New Jersey Student Learning Standards (NJSLS)

HS-ETS1-1: Analyze a major global challenge to specify qualitative and quantitative criteria and constraints for solutions that account for societal needs and wants.

HS-ETS1-3: Evaluate a solution to a complex real-world problem based on prioritized criteria and trade-offs that account for a range of constraints, including cost, safety, reliability, and aesthetics as well as possible social, cultural, and environmental impacts.

Science & Engineering Practices	Disciplinary Core Ideas	Cross-Cutting Concepts
Asking Questions and Defining Problems - Analyze complex real-world problems by specifying criteria and constraints for successful solutions. Constructing Explanations and Designing Solutions - Evaluate a solution to a complex real-world problem, based on scientific knowledge, student-generated sources of evidence, prioritized criteria, and tradeoff considerations.	ETS1.A: Defining and Delimiting Engineering Problems - Criteria and constraints also include satisfying any requirements set by society, such as taking issues of risk mitigation into account, and they should be quantified to the extent possible and stated in such a way that one can tell if a given design meets them. - Humanity faces major global challenges today, such as the need for supplies of clean water and food or for energy sources that minimize pollution, which can be addressed through engineering. These global challenges also may have manifestations in local communities. ETS1.B: Developing Possible Solutions - When evaluating solutions, it is important to take into account a range of constraints, including cost, safety, reliability, and aesthetics, and to consider social, cultural, and environmental impacts.	Asking Questions and Defining Problems - Analyze complex real-world problems by specifying criteria and constraints for successful solutions. ----- Connections to Engineering, Technology, and Applications of Science Influence of Science, Engineering, and Technology on Society and the Natural World - New technologies can have deep impacts on society and the environment, including some that were not anticipated. Analysis of costs and benefits is a critical aspect of decisions about technology.

Essential Questions	Student Learning Objectives	Suggested Tasks/Activities	Evidence of Learning (Assessment)
- How has the internet's design and purpose changed over time, and how has each stage fundamentally altered how we interact with information and each other? - How does social media shape our understanding of ourselves, our relationships, and the world around us? - In what ways has the internet created a "shrinking world," and what are the ethical and political consequences of this new global connectivity?	Student will be able to: - Analyze a major global problem by describing the challenge with a rationale for why it is a major global challenge, describing the extent and depth of the problem and the consequences to society on both global and local levels - Identify the system in which the problem exists and specify qualitative and quantitative criteria and constraints for developing acceptable solutions to the problem. - Explain the characteristics of the three major eras of the internet: Web 1.0 (read only), Web 2.0 (social), and Web 3.0 (decentralized). - Analyze how the evolution of the internet shifted power from a few content producers to millions of users. - Identify the key technologies that enabled the shift in the Internet's power from a few content producers to millions of users/producers and understand the societal implications of these technologies - Analyze the impact of social media on personal identity (digital self vs actual self). - Evaluate the effects of social media on relationships (both positive and negative). - Investigate the mental health implications of social media,	- Research the internet's early days (mid-1990s to early 2000s) as an information resource and discuss how information was disseminated from websites to users. - Create a timeline of key internet milestones, identifying which era each event belongs to and explaining its impact on society - Compare an archived Web 1.0 website (e.g., from Geocities) with a modern Web 2.0 site to highlight differences in design, function, and user interaction - Research the psychological impacts of social media, from the positive (e.g., finding support groups) to the negative (e.g., body image issues, constant social comparison) - Students reflect on their own social media use, and discuss how they present themselves online and the potential future consequences of their posts. - Select a global issue discussed this year and analyze how it is discussed on social media in at least three different countries, noting similarities and differences in rhetoric and sentiment. - Formal debate arguing: "The internet's overall impact on society is more positive than negative."	- Homework, quizzes, tests, lab activities, projects, presentations, webquests, and case studies as decided by individual teachers - Evaluate the social media research project - Evaluate student debate on overall impact of social media (see resources for rubric link)

	(ex. cyberbullying, "fear of missing out" (FOMO), and addiction). • Identify how online communities are formed and the effects they have on their members • Discuss how the internet has made it easier to connect with people from different cultures. • Explore the challenges of global communication, such as cultural misunderstandings and the spread of misinformation across borders • Evaluate the impact of social media on political discourse (organizing protests, polarizing citizens). • Predict potential future societal changes based on current and emerging internet technologies.		
Interdisciplinary Connections	• RI.CR.11–12.1: Accurately cite a range of thorough textual evidence and make relevant connections to strongly support a comprehensive analysis of multiple aspects of what an informational text says explicitly and inferentially, as well as interpretations of the text. • RI.MF.11–12.6: Synthesize complex information across multiple sources and formats to develop ideas, resolve conflicting information, or develop an interpretation that goes beyond explicit text information (e.g., express a personal point of view, new interpretation of the concept). • RI.CT.11–12.8: Analyze and reflect on (e.g., practical knowledge, historical/cultural context, and background knowledge) documents of historical and scientific significance for their purposes, including primary source documents relevant to U.S. and/or global history and texts proposing scientific or technical advancements. • W.AW.11–12.1: Write arguments to support claims in an analysis of substantive topics or texts, using valid reasoning and relevant and sufficient evidence. • SL.PE.11–12.1: Initiate and participate effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with peers on grades 11–12 topics, texts, and issues, building on others' ideas and expressing their own clearly and persuasively. • SL.II.11–12.2: Integrate multiple sources of information presented in diverse formats and media (e.g., visually, quantitatively, orally) in order to make informed decisions and solve problems, evaluating the credibility and accuracy of each source and noting any discrepancies among the data.		

	● SL.PI.11–12.4: Present information, findings and supporting evidence clearly, concisely, and logically. The content, organization, development, and style are appropriate to task, purpose, and audience. ● 1.5.12prof.Cn10a: Document the process of developing ideas from early stages to fully elaborated ideas.		
Career Readiness, Life Literacies, and Key Skills	● 9.1.12.FP.5: Evaluate how behavioral bias (e.g., overconfidence, confirmation, recency, loss aversion, etc.) affects decision-making. ● 9.2.12.CAP.3: Investigate how continuing education contributes to one's career and personal growth. ● 9.4.12.CI.1: Demonstrate the ability to reflect, analyze, and use creative skills and ideas. ● 9.4.12.CT.4: Participate in online strategy and planning sessions for course-based, school-based, or other projects and determine the strategies that contribute to effective outcomes. ● 9.4.12.DC.3: Evaluate the social and economic implications of privacy in the context of safety, law, or ethics (e.g., 6.3.12.HistoryCA.1).		
Computer Science and Design Thinking	● 8.1.12.DA.5: Create data visualizations from large data sets to summarize, communicate, and support different interpretations of real-world phenomena. ● 8.1.12.IC.3: Predict the potential impacts and implications of emerging technologies on larger social, economic, and political structures, using evidence from credible sources. ● 8.2.12.EC.1: Analyze controversial technological issues and determine the degree to which individuals, businesses, and governments have an ethical role in decisions that are made. ● 8.2.12.EC.2: Assess the positive and negative impacts of emerging technologies on developing countries and evaluate how individuals, non-profit organizations, and governments have responded. ● 8.2.12.EC.3: Synthesize data, analyze trends, and draw conclusions regarding the effect of a technology on the individual, culture, society, and environment and share this information with the appropriate audience.		
Modifications			
Multi-Lingual Learners	Students with Special Needs	At-Risk	Gifted and Talented
● Give multilingual learners with lower reading proficiency the option of focusing on the diagrams and animations, but encourage them to closely read a paragraph or two of the longer texts, so they practice and better comprehend the details shared by you and their classmates. ● Using classroom routines (such as <i>Domino Discover</i>) provides support for multilingual learners to	● Use scaffolds, such as prompting ● Provide extended time for written responses and reports. ● Use a graphic organizer to categorize concepts. ● Get a written list of instructions	● If students are struggling with starting models, use guiding questions. ● Use a graphic organizer to categorize concepts. ● Provide an outline for research and design tasks. ● Provide extended time for written responses and reports. ● Incorporate student choice	● Encourage students to work on advanced requirements or higher achievement levels, when applicable. ● Offer choices of assignments to further content knowledge, once finished with a basic task, with personal interest being the key.

provide different types of input, all from peers in the classroom, to students' language development. • Allow student access to translation services such as Google Translate or PaperPal • When possible, modify assignments so the ELL student writes less, has simpler questions to answer, fewer spelling words, etc. • Provide models of completed homework assignments, projects, etc. • Assign a native language partner. • Provide extended time for written responses and reports.	• Receive large project as smaller tasks with individual deadlines • Work or take a test in a different setting, such as a quiet room with few distractions • Sit where they learn best (for example, near the teacher) • Use an alarm to help with time management • Work with a partner • Print out larger versions of text and diagrams to ensure visibility is not a barrier. • Word bank/definitions available for remembering the different theories of ethics • Chunk the formal debate into manageable steps	• Provide peer mentoring to improve techniques • Use effort and achievement rubrics • Assure students they can be successful • Allow students many opportunities for practice and learning • Use scaffolding for complex tasks See MLL, point 1.	• Expand the social media research project to multiple countries in a variety of socioeconomic conditions and see if that changes your findings.
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Science, Ethics, Technology, & Society**Unit 11: Technology and Governance****Related Phenomena:** Cyber Attacks and Cybersecurity

Students will learn about the latest types of cyber attacks that are impacting our population and how modern tech companies use cybersecurity to combat those threats. Students will then discuss the importance of protecting their identity online and how to ensure that their identification and financial information remains private.

- **Driving Question:** How can our digital world be effectively protected from ever-evolving threats?
- [Cyber Threats: Latest Trends and Avoiding Attacks](#) - International Legal Technology Association YouTube Channel
- [Cybersecurity Trends for 2025 and Beyond](#) - IBM Technology YouTube Channel

Pacing: 2 weeks (approximately 8 classes)**New Jersey Student Learning Standards (NJSLS)**

HS-ETS1-1: Analyze a major global challenge to specify qualitative and quantitative criteria and constraints for solutions that account for societal needs and wants.

HS-ETS1-3: Evaluate a solution to a complex real-world problem based on prioritized criteria and trade-offs that account for a range of constraints, including cost, safety, reliability, and aesthetics as well as possible social, cultural, and environmental impacts.

Science & Engineering Practices	Disciplinary Core Ideas	Cross-Cutting Concepts
Asking Questions and Defining Problems - Analyze complex real-world problems by specifying criteria and constraints for successful solutions. Constructing Explanations and Designing Solutions - Evaluate a solution to a complex real-world problem, based on scientific knowledge, student-generated sources of evidence, prioritized criteria, and tradeoff considerations.	ETS1.A: Defining and Delimiting Engineering Problems - Criteria and constraints also include satisfying any requirements set by society, such as taking issues of risk mitigation into account, and they should be quantified to the extent possible and stated in such a way that one can tell if a given design meets them. - Humanity faces major global challenges today, such as the need for supplies of clean water and food or for energy sources that minimize pollution, which can be addressed through engineering. These global challenges also may have manifestations in local communities. ETS1.B: Developing Possible Solutions - When evaluating solutions, it is important to take into account a range of constraints, including cost, safety, reliability, and aesthetics, and to consider social, cultural, and environmental impacts.	Asking Questions and Defining Problems - Analyze complex real-world problems by specifying criteria and constraints for successful solutions. ----- Connections to Engineering, Technology, and Applications of Science Influence of Science, Engineering, and Technology on Society and the Natural World - New technologies can have deep impacts on society and the environment, including some that were not anticipated. Analysis of costs and benefits is a critical aspect of decisions about technology.

Essential Questions	Student Learning Objectives	Suggested Tasks/Activities	Evidence of Learning (Assessment)
- How can governments use technology to benefit their citizens while protecting their privacy and freedom? - Who is responsible for protecting our digital world from threats? - How can we regulate the power of the corporations that control the digital world?	Student will be able to: - Analyze a major global problem by describing the challenge with a rationale for why it is a major global challenge, describing the extent and depth of the problem and the consequences to society on both global and local levels - Identify the system in which the problem exists and specify qualitative and quantitative criteria and constraints for developing acceptable solutions to the problem. - Identify and analyze how governments use technology for public services and policy implementation. - Evaluate the ethical and legal implications of data collection by governments and corporations. - Explain the purpose and impact of major data privacy regulations, such as the General Data Protection Regulation (GDPR) in Europe and the California Consumer Privacy Act (CCPA). - Investigate how technology can be used for social control and surveillance. - Identify and explain key cybersecurity threats to national infrastructure and personal data. - Analyze the concepts of cyberwarfare, state-sponsored hacking, and the ethical dilemmas they present.	- Partake in the analysis of case studies that simulate ethical questions that pertain to unit topics – vary the argument for each (not all pro/against) - Act as a public health committee deciding whether to implement a contact-tracing app, weighing the public good against individual privacy. - Research and present on an example of censorship and control of information in a country, analyzing the tools and methods used. - Design a data privacy policy for a fictional social media company, outlining what data they can collect and how it must be used. - When given an example of a cyber attack, students must design and present how to identify the threat, propose a response/solution to the problem, and discuss the ethical considerations of the attack itself. - Formal debate on the following statement dealing with anti-trust laws: "The government should break up tech giants to foster competition and innovation." - Create a presentation or video on a current cybersecurity or regulation challenge, defining the problem, analyzing its ethical and social dimensions, and proposing a viable solution.	- Homework, quizzes, tests, lab activities, projects, presentations, webquests, and case studies as decided by individual teachers - Evaluate the presentation on the control of information via technological means in different countries - Evaluate the fictional social media companies means and reason for collecting data - Evaluate the formal debate on anti-trust laws - Evaluate the assignment and final video project on cybersecurity and dealing with online threats

	Evaluate the role of governments in regulating technology giants, focusing on antitrust issues.		
Interdisciplinary Connections	RI.CR.11–12.1: Accurately cite a range of thorough textual evidence and make relevant connections to strongly support a comprehensive analysis of multiple aspects of what an informational text says explicitly and inferentially, as well as interpretations of the text. RI.MF.11–12.6: Synthesize complex information across multiple sources and formats to develop ideas, resolve conflicting information, or develop an interpretation that goes beyond explicit text information (e.g., express a personal point of view, new interpretation of the concept). RI.CT.11–12.8: Analyze and reflect on (e.g., practical knowledge, historical/cultural context, and background knowledge) documents of historical and scientific significance for their purposes, including primary source documents relevant to U.S. and/or global history and texts proposing scientific or technical advancements. W.AW.11–12.1: Write arguments to support claims in an analysis of substantive topics or texts, using valid reasoning and relevant and sufficient evidence. SL.PE.11–12.1: Initiate and participate effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with peers on grades 11–12 topics, texts, and issues, building on others' ideas and expressing their own clearly and persuasively. SL.II.11–12.2: Integrate multiple sources of information presented in diverse formats and media (e.g., visually, quantitatively, orally) in order to make informed decisions and solve problems, evaluating the credibility and accuracy of each source and noting any discrepancies among the data. SL.PI.11–12.4: Present information, findings and supporting evidence clearly, concisely, and logically. The content, organization, development, and style are appropriate to task, purpose, and audience. 1.5.12prof.Cn10a: Document the process of developing ideas from early stages to fully elaborated ideas.		
Career Readiness, Life Literacies, and Key Skills	9.1.12.FP.5: Evaluate how behavioral bias (e.g., overconfidence, confirmation, recency, loss aversion, etc.) affects decision-making. 9.2.12.CAP.3: Investigate how continuing education contributes to one's career and personal growth. 9.4.12.CI.1: Demonstrate the ability to reflect, analyze, and use creative skills and ideas. 9.4.12.CT.4: Participate in online strategy and planning sessions for course-based, school-based, or other projects and determine the strategies that contribute to effective outcomes. 9.4.12.DC.3: Evaluate the social and economic implications of privacy in the context of safety, law, or ethics (e.g., 6.3.12.HistoryCA.1).		
Computer Science and Design Thinking			

	● 8.1.12.DA.5: Create data visualizations from large data sets to summarize, communicate, and support different interpretations of real-world phenomena. ● 8.1.12.IC.3: Predict the potential impacts and implications of emerging technologies on larger social, economic, and political structures, using evidence from credible sources. ● 8.2.12.EC.3: Synthesize data, analyze trends, and draw conclusions regarding the effect of a technology on the individual, culture, society, and environment and share this information with the appropriate audience.		
Modifications			
Multi-Lingual Learners	Students with Special Needs	At-Risk	Gifted and Talented
● Give multilingual learners with lower reading proficiency the option of focusing on the diagrams and animations, but encourage them to closely read a paragraph or two of the longer texts, so they practice and better comprehend the details shared by you and their classmates. ● Using classroom routines (such as <i>Domino Discover</i>) provides support for multilingual learners to provide different types of input, all from peers in the classroom, to students' language development. ● Allow student access to translation services such as Google Translate or PaperPal ● When possible, modify assignments so the ELL student writes less, has simpler questions to answer, fewer spelling words, etc. ● Provide models of completed homework assignments, projects, etc. ● Assign a native language partner. ● Provide extended time for written responses and reports.	● Use scaffolds, such as prompting ● Provide extended time for written responses and reports. ● Use a graphic organizer to categorize concepts. ● Get a written list of instructions ● Receive large project as smaller tasks with individual deadlines ● Work or take a test in a different setting, such as a quiet room with few distractions ● Sit where they learn best (for example, near the teacher) ● Use an alarm to help with time management ● Work with a partner ● Print out larger versions of text and diagrams to ensure visibility is not a barrier. ● Word bank/definitions available for remembering the different theories of ethics ● Chunk the final video project and allow students to turn in pieces of the video as finished instead of one large video.	● If students are struggling with starting models, use guiding questions. ● Use a graphic organizer to categorize concepts. ● Provide an outline for research and design tasks. ● Provide extended time for written responses and reports. ● Incorporate student choice ● Provide peer mentoring to improve techniques ● Use effort and achievement rubrics ● Assure students they can be successful ● Allow students many opportunities for practice and learning ● Use scaffolding for complex tasks See MLL, point 1.	● Encourage students to work on advanced requirements or higher achievement levels, when applicable. ● Offer choices of assignments to further content knowledge, once finished with a basic task, with personal interest being the key. ● Research how current social media companies use the data they collect and determine ways in which that company can maintain its current business model without collecting data.

Science, Ethics, Technology, & Society**Unit 12: Space Exploration and Colonization****Related Phenomena:** Colonization of Mars

Students will learn about current plans to colonize Mars in the future and whether those plans are rooted in realistic science or just a feel good story. Each of the topics covered in the video linked below will be dissected and discussed. Students will then predict whether this feat will ever be accomplished in the future.

- **Driving Question:** Is the colonization of another planet realistic and what right do humans have to modify an entire planet to fit our needs?
- [Can Humans Really Colonize Mars?](#) - TopTenz YouTube Channel

Pacing: 2 weeks (approximately 8 classes)**New Jersey Student Learning Standards (NJSLS)**

HS-ETS1-1: Analyze a major global challenge to specify qualitative and quantitative criteria and constraints for solutions that account for societal needs and wants.

HS-ETS1-3: Evaluate a solution to a complex real-world problem based on prioritized criteria and trade-offs that account for a range of constraints, including cost, safety, reliability, and aesthetics as well as possible social, cultural, and environmental impacts.

Science & Engineering Practices	Disciplinary Core Ideas	Cross-Cutting Concepts
Asking Questions and Defining Problems - Analyze complex real-world problems by specifying criteria and constraints for successful solutions. Constructing Explanations and Designing Solutions - Evaluate a solution to a complex real-world problem, based on scientific knowledge, student-generated sources of evidence, prioritized criteria, and tradeoff considerations.	ETS1.A: Defining and Delimiting Engineering Problems - Criteria and constraints also include satisfying any requirements set by society, such as taking issues of risk mitigation into account, and they should be quantified to the extent possible and stated in such a way that one can tell if a given design meets them. - Humanity faces major global challenges today, such as the need for supplies of clean water and food or for energy sources that minimize pollution, which can be addressed through engineering. These global challenges also may have manifestations in local communities. ETS1.B: Developing Possible Solutions - When evaluating solutions, it is important to take into account a range of constraints, including cost, safety, reliability, and aesthetics, and to consider social, cultural, and environmental impacts.	Asking Questions and Defining Problems - Analyze complex real-world problems by specifying criteria and constraints for successful solutions. ----- Connections to Engineering, Technology, and Applications of Science Influence of Science, Engineering, and Technology on Society and the Natural World - New technologies can have deep impacts on society and the environment, including some that were not anticipated. Analysis of costs and benefits is a critical aspect of decisions about technology.

Essential Questions	Student Learning Objectives	Suggested Tasks/Activities	Evidence of Learning
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			(Assessment)
- What resources are necessary for space colonization, and how can they be acquired and used ethically? - What are the potential physiological and psychological effects of long-term space travel and living in extraterrestrial environments? - Should humans consider the following ethical dilemmas surrounding space colonization: planetary protection, resource distribution, and environmental impacts? - How could space colonization impact human society, culture, and what it means to be human?	Student will be able to: - Analyze a major global problem by describing the challenge with a rationale for why it is a major global challenge, describing the extent and depth of the problem and the consequences to society on both global and local levels - Identify the system in which the problem exists and specify qualitative and quantitative criteria and constraints for developing acceptable solutions to the problem. - Explain how orbital mechanics, propulsion systems, and the physiological effects of microgravity and radiation on the human body would need to be considered for long term space travel. - Discuss how planets would need to be protected from forward (Earth -> planet) and backward (back to Earth) contamination of life. - Explain the laws currently governing space economics: Outer Space Treaty of 1967, Artemis Accords - Investigate the psychological challenges of long-duration space travel and isolation - Discuss what a space colony would mean for life on Earth: social hierarchy, the psychological impact of a "backup" planet, and the potential for a select elite to escape Earth's problems.	- Partake in the analysis of case studies that simulate ethical questions that pertain to unit topics – vary the argument for each (not all pro/against) - Hold an informal class discussion on whether space resources should be treated as a common resource for all humanity and regulated by an international body. - Design a mission to a celestial body and create a plan to prevent contamination, detailing the sterilization and operational procedures needed. - Students take on roles as colonists, psychologists, and lawmakers for a new space colony. They debate and develop a set of fundamental social and governing rules, like resource allocation, labor expectations, and reproduction policies. - Write an essay arguing for or against the necessity of human space colonization, using learned knowledge of ethical principles and scientific evidence to support their position.	- Homework, quizzes, tests, lab activities, projects, presentations, webquests, and case studies as decided by individual teachers - Evaluate the position paper on colonization of space.

	- Consider the political and legal frameworks needed for a new society in space. (How is it governed: Independently or from Earth?) - Discuss the science and ethics behind terraforming.		
Interdisciplinary Connections	RI.CR.11–12.1: Accurately cite a range of thorough textual evidence and make relevant connections to strongly support a comprehensive analysis of multiple aspects of what an informational text says explicitly and inferentially, as well as interpretations of the text. RI.MF.11–12.6: Synthesize complex information across multiple sources and formats to develop ideas, resolve conflicting information, or develop an interpretation that goes beyond explicit text information (e.g., express a personal point of view, new interpretation of the concept). RI.CT.11–12.8: Analyze and reflect on (e.g., practical knowledge, historical/cultural context, and background knowledge) documents of historical and scientific significance for their purposes, including primary source documents relevant to U.S. and/or global history and texts proposing scientific or technical advancements. W.AW.11–12.1: Write arguments to support claims in an analysis of substantive topics or texts, using valid reasoning and relevant and sufficient evidence. SL.PE.11–12.1: Initiate and participate effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with peers on grades 11–12 topics, texts, and issues, building on others' ideas and expressing their own clearly and persuasively. SL.II.11–12.2: Integrate multiple sources of information presented in diverse formats and media (e.g., visually, quantitatively, orally) in order to make informed decisions and solve problems, evaluating the credibility and accuracy of each source and noting any discrepancies among the data. SL.PI.11–12.4: Present information, findings and supporting evidence clearly, concisely, and logically. The content, organization, development, and style are appropriate to task, purpose, and audience. 1.5.12prof.Cn10a: Document the process of developing ideas from early stages to fully elaborated ideas.		
Career Readiness, Life Literacies, and Key Skills	9.1.12.FP.5: Evaluate how behavioral bias (e.g., overconfidence, confirmation, recency, loss aversion, etc.) affects decision-making. 9.2.12.CAP.3: Investigate how continuing education contributes to one's career and personal growth. 9.4.12.CI.1: Demonstrate the ability to reflect, analyze, and use creative skills and ideas. 9.4.12.CT.4: Participate in online strategy and planning sessions for course-based, school-based, or other projects and determine the strategies that contribute to effective outcomes.		

	● 9.4.12.DC.3: Evaluate the social and economic implications of privacy in the context of safety, law, or ethics (e.g., 6.3.12.HistoryCA.1).		
Computer Science and Design Thinking	● 8.1.12.DA.5: Create data visualizations from large data sets to summarize, communicate, and support different interpretations of real-world phenomena. ● 8.1.12.IC.3: Predict the potential impacts and implications of emerging technologies on larger social, economic, and political structures, using evidence from credible sources. ● 8.2.12.EC.3: Synthesize data, analyze trends, and draw conclusions regarding the effect of a technology on the individual, culture, society, and environment and share this information with the appropriate audience.		
Modifications			
Multi-Lingual Learners	Students with Special Needs	At-Risk	Gifted and Talented
● Give multilingual learners with lower reading proficiency the option of focusing on the diagrams and animations, but encourage them to closely read a paragraph or two of the longer texts, so they practice and better comprehend the details shared by you and their classmates. ● Using classroom routines (such as <i>Domino Discover</i>) provides support for multilingual learners to provide different types of input, all from peers in the classroom, to students' language development. ● Allow student access to translation services such as Google Translate or PaperPal ● When possible, modify assignments so the ELL student writes less, has simpler questions to answer, fewer spelling words, etc. ● Provide models of completed homework assignments, projects, etc.	● Use scaffolds, such as prompting ● Provide extended time for written responses and reports. ● Use a graphic organizer to categorize concepts. ● Get a written list of instructions ● Receive large project as smaller tasks with individual deadlines ● Work or take a test in a different setting, such as a quiet room with few distractions ● Sit where they learn best (for example, near the teacher) ● Use an alarm to help with time management ● Work with a partner ● Print out larger versions of text and diagrams to ensure visibility is not a barrier.	● If students are struggling with starting models, use guiding questions. ● Use a graphic organizer to categorize concepts. ● Provide an outline for research and design tasks. ● Provide extended time for written responses and reports. ● Incorporate student choice ● Provide peer mentoring to improve techniques ● Use effort and achievement rubrics ● Assure students they can be successful ● Allow students many opportunities for practice and learning ● Use scaffolding for complex tasks - See MLL, point 1.	● Encourage students to work on advanced requirements or higher achievement levels, when applicable. ● Offer choices of assignments to further content knowledge, once finished with a basic task, with personal interest being the key. ● Compare the science shown in <i>The Martian</i> with what is realistically available to us at the moment and write a response explaining how far into the future that scenario is from beginning possible.

• Assign a native language partner. • Provide extended time for written responses and reports.	• Word bank/definitions available for remembering the different theories of ethics • Provide revision of the position paper on space colonization.		
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Course Resources
• 2026 New Jersey Student Learning Standards for Science – https://www.nj.gov/education/standards/science/2026/ • New Jersey Student Learning Standards (All Content Areas) – https://www.nj.gov/education/standards/ • New Jersey Department of Education Climate Change Resources – https://www.nj.gov/education/climate/ • U.S. Food and Drug Administration (FDA) – https://www.fda.gov/ • Centers for Disease Control and Prevention (CDC) – https://www.cdc.gov/ • National Institutes of Health (NIH) – https://www.nih.gov/ • National Library of Medicine – https://www.nlm.nih.gov/ • PubMed – https://pubmed.ncbi.nlm.nih.gov/ • MedlinePlus – https://medlineplus.gov/ • National Center for Biotechnology Information (NCBI) – https://www.ncbi.nlm.nih.gov/ • World Health Organization (WHO) – https://www.who.int/ • American Medical Association (AMA) – https://www.ama-assn.org/ • American Society for Bioethics and Humanities – https://asbh.org/ • National Human Genome Research Institute – https://www.genome.gov/ • MedlinePlus Genetics – https://medlineplus.gov/genetics/ • DNA Learning Center (Cold Spring Harbor Laboratory) – https://dnalc.cshl.edu/ • HHMI BioInteractive – https://www.biointeractive.org/ • OpenStax Biology 2e – https://openstax.org/details/books/biology-2e • Khan Academy Biology – https://www.khanacademy.org/science/biology • ExploreLearning Gizmos – https://www.explorellearning.com/ • BioInteractive Virtual Labs – https://www.biointeractive.org/classroom-resources

- Science Buddies – <https://www.sciencebuddies.org/>
- National Center for Case Study Teaching in Science – <https://sciencecases.lib.buffalo.edu/>
- Google Scholar – <https://scholar.google.com/>
- Nature Education Scitable – <https://www.nature.com/scitable/>
- CRISPR Explained (Broad Institute) – <https://www.broadinstitute.org/what-broad/areas-focus/project-spotlight/crispr>
- National Organ Procurement and Transplantation Network (OPTN) – <https://optn.transplant.hrsa.gov/>
- United Network for Organ Sharing (UNOS) – <https://unos.org/>
- Health Resources and Services Administration Organ Donation – <https://www.organdonor.gov/>
- The Immortal Life of Henrietta Lacks (Official Website) – <https://rebeccaskloot.com/the-immortal-life/>
- National Archives – Nuremberg Code – <https://www.archives.gov/research/holocaust/finding-aids/medical-records>
- United States Holocaust Memorial Museum – <https://www.ushmm.org/>
- ClinicalTrials.gov – <https://clinicaltrials.gov/>
- National Institute of Justice – <https://nij.ojp.gov/>
- National Academies of Sciences, Engineering, and Medicine – <https://www.nationalacademies.org/>
- National Science Teaching Association (NSTA) – <https://www.nsta.org/>
- National Geographic Education – <https://education.nationalgeographic.org/>
- Our World in Data – <https://ourworldindata.org/>
- Pew Research Center – Science & Society – <https://www.pewresearch.org/science/>
- NASA – <https://www.nasa.gov/>
- European Space Agency – <https://www.esa.int/>
- SpaceX – <https://www.spacex.com/>
- Artemis Program (NASA) – <https://www.nasa.gov/artemis/>
- Colossal Biosciences – <https://colossal.com/>
- Internet Encyclopedia of Philosophy – <https://iep.utm.edu/>
- Stanford Encyclopedia of Philosophy – <https://plato.stanford.edu/>
- The Hastings Center – <https://www.thehastingscenter.org/>
- UNESCO Bioethics Programme – <https://www.unesco.org/en/ethics-science-and-technology>
- World Medical Association – Declaration of Helsinki – <https://www.wma.net/what-we-do/medical-ethics/declaration-of-helsinki/>
- National Constitution Center – <https://constitutioncenter.org/>
- Oyez (U.S. Supreme Court Cases) – <https://www.oyez.org/>
- Cornell Legal Information Institute – <https://www.law.cornell.edu/>
- United States Department of Justice – <https://www.justice.gov/>
- Federal Trade Commission – <https://www.ftc.gov/>
- National Institute of Standards and Technology (NIST) – <https://www.nist.gov/>
- U.S. Bureau of Labor Statistics Occupational Outlook Handbook – <https://www.bls.gov/ooh/>
- O*NET OnLine – <https://www.onetonline.org/>
- CareerOneStop – <https://www.careeronestop.org/>
- ExploreHealthCareers.org – <https://explorehealthcareers.org/>
- New Jersey Career Assistance Navigator (NJCAN) – <https://portal.njcis.intocareers.org/>
- New Jersey Department of Labor and Workforce Development – <https://www.nj.gov/labor/>

- [Nine Theories of Ethics - Louisiana Tech University](#)
- [Colorado School of Mines Ethical Argument Rubrics](#)
- Position Paper Grading Rubric
- Formal Debate Grading Rubric
- Formal Debate Format
- Presentation Grading Rubric
- Red Market Video Grading Rubric
- Clinical Trial Project Grading Rubric
- AES Project Information
- AES Project Grading Rubric