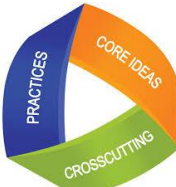
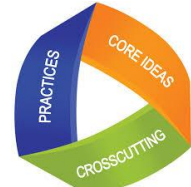


| Grade 8 Science   |   |  |                                 |   |                                   |   |
|---|---|--|---------------------------------|---|-----------------------------------|---|
| Grade Level Overview  | Eighth grade is a year long study of the crosscutting concepts of scale, proportion, and quantity. Students explore and explain phenomena related to objects and interactions at a wide range of scales—from the molecules that comprise genes to the gravitational fields that operate within and beyond the solar system. |  |                                 |   |                                   |   |
| Disciplinary Core Ideas   |   | Science and Engineering Principles                                     |                                 | NGSS 3 Dimensions   |                                   |    |
| Physical Science  | Force and Motion  | Asking questions (for science) and defining problems (for engineering) | Patterns                        |   |                                   |   |
|   | Fields and Interaction  | Developing and using models  | Cause and effect                |   |                                   |   |
| Life Science  | Waves   | Planning and carrying out investigations                               | Scale, proportion, and quantity |   |                                   |   |
|   | Reproduction  | Analyzing and interpreting data  | Systems and system models       |   |                                   |   |
| Earth and Space Science   | Evolution   | Using mathematics and computational thinking                           | Energy and matter               |   |                                   |   |
|   |   | Constructing explanations and designing solutions                      | Structure and function          |   |                                   |   |
| Engineering, Technology, & Applications of Science                    | Solar System and Beyond   | Engaging in argument from evidence                                     | Stability and change            |   |                                   |   |
|   |   | Obtaining, evaluating, and communicating information                   |                                 |   |                                   |   |
|   | Force and Motion  |  |                                 |   |                                   |   |
|   | Fields and Interaction  |  |                                 |   |                                   |   |
| Unit: Force and Motion  |   |  |                                 |   |                                   |   |
| Essential Question  | Performance Expectations  |  | CCSS ELA                        |   | CCSS Math                         |   |
| How can we reduce the risks of motor vehicle accidents?               | <i>Students who demonstrate understanding can:</i>  |  |                                 | Cite specific textual evidence to support analysis of science and technical texts, attending to the precise details of explanations or descriptions.  | Mathematical Practice             | Reason abstractly and quantitatively.   |
|   | MS-PS2-1: Apply Newton's Third Law to design a solution to a problem involving the motion of two colliding objects.   | Reading in Science and Technical Subjects                              |                                 | Integrate quantitative or technical information expressed in words in a text with a version of that information expressed visually (e.g., in a flowchart, diagram, model, graph, or table).                                 | Ratios and Proportional Reasoning | 6.RP.A.2 Understand the concept of a unit rate $a/b$ associated with a ratio $a:b$ with $b \neq 0$ , and use rate language in the context of a ratio relationship.  |
|   | MS-PS2-2: Plan an investigation to provide evidence that the change in an object's motion depends on the sum of the forces on the object and the mass of the object.  |  |                                 | Follow precisely a multi-step procedure when carrying out experiments, taking measurements, or performing technical tasks.  |                                   | 7.RP.A. Recognize and represent proportional relationships between quantities.  |
|   | MS-PS3-1: Construct and interpret graphical displays of data to describe the relationships of kinetic energy to the mass of an object and to the speed of an object.  |  |                                 |   |                                   | 8.EE.A.2 Use square root and cube root symbols to represent solutions to equations of the form $x^2 = p$ and $x^3 = p$ , where $p$ is a positive rational number. Evaluate square roots of small perfect squares and cube roots of small perfect cubes. Know that $\sqrt{2}$ is irrational.   |
|   | MS-ETS1-1: Define the criteria and constraints of a design problem with sufficient precision to ensure a successful solution, taking into account relevant scientific principles and potential impacts on people and the natural environment that may limit possible solutions.   | Writing in History/Social Studies, Science, and Technological Subjects |                                 | Conduct short research projects to answer a question (including a self-generated question), drawing on several sources and generating additional related, focused questions that allow for multiple avenues of exploration. | Expressions and Equations         | 7.EE.B.4 Use variables to represent quantities in a realworld or mathematical problem, and construct simple equations or inequalities to solve problems by reasoning about the quantities.  |
|   | MS-ETS1-2: Evaluate competing design solutions using a systematic process to determine how well they meet the criteria and constraints of the problem.  |  |                                 | Draw evidence from informational texts to support analysis, reflection, and research.   |                                   |   |
|   | MS-ETS1-3: Analyze data from tests to determine similarities and differences among several design solutions to identify the best characteristics of each that can be combined into a new solution to better meet the criteria for success.  |  |                                 | Write arguments focused on discipline-specific content.   | Statistics and Probability        | 6.SP.B.5 Summarize numerical data sets in relation to their context.  |
|   | MS-ETS1-4: Develop a model to generate data for iterative testing and modification of a proposed object, tool, or process such that an optimal design can be achieved.  |  |                                 |   |                                   |   |
| Unit: Fields and Interaction  |   |  |                                 |   |                                   |   |
| Essential Question  | Performance Expectations  |  | CCSS ELA                        |   | CCSS Math                         |   |
| How do different types of force fields help us design transportation? | <i>Students who demonstrate understanding can:</i>  |  |                                 | Cite specific textual evidence to support analysis of science and technical texts, attending to the precise details of explanations or descriptions.  | Mathematical Practice             | Reason abstractly and quantitatively.   |
|   | MS-PS2-3: Ask questions about data to determine the factors that affect the strength of electric and magnetic forces.   | Reading in Science and Technical Subjects                              |                                 | Integrate quantitative or technical information expressed in words in a text with a version of that information expressed visually (e.g., in a flowchart, diagram, model, graph, or table).                                 | Expressions and Equations         | 6.EE.C.9 Use variables to represent two quantities in a real-world problem that change in relationship to one another; write an equation to express one quantity, thought of as the dependent variable, in terms of the other quantity, thought of as the independent variable. Analyze the relationship between the dependent and independent variables using graphs and tables, and relate these to the equation. |
|   | MS-PS2-4: Construct and present arguments using evidence to support the claim that gravitational interactions are attractive and depend on the masses of interacting objects.   |  |                                 | Compare and contrast the information gained from experiments, simulations, video, or multimedia sources with that gained from reading a text on the same topic.   |                                   |   |
|   | MS-PS2-5: Conduct an investigation and evaluate the experimental design to provide evidence that fields exist between objects exerting forces on each other even though the objects are not in contact.   |  |                                 | Follow precisely a multi-step procedure when carrying out experiments, taking measurements, or performing technical tasks.  |                                   |   |
|   | MS-PS3-2: Develop a model to describe that when the arrangement of objects interacting at a distance changes, different amounts of potential energy are stored in the system.   |  |                                 | Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 6–8 texts and topics.                            |                                   |   |
|   | MS-ETS1-1: Define the criteria and constraints of a design problem with sufficient precision to ensure a successful solution, taking into account relevant scientific principles and potential impacts on people and the natural environment that may limit possible solutions.   | Writing in History/Social Studies, Science, and Technological Subjects |                                 | Write arguments focused on discipline-specific content.   |                                   |   |
|   | MS-ETS1-2: Evaluate competing design solutions using a systematic process to determine how well they meet the criteria and constraints of the problem.  |  |                                 | Draw evidence from informational texts to support analysis, reflection, and research.   |                                   |   |
|   |   | Speaking and listening   |                                 | Conduct short research projects to answer a question (including a self-generated question), drawing on several sources and generating additional related, focused questions that allow for multiple avenues of exploration. |                                   |   |
|   |   |  |                                 | Integrate multimedia and visual displays into presentations to clarify information, strengthen claims and evidence, and add interest.   |                                   |   |
| Unit: Waves   |   |  |                                 |   |                                   |   |
| Essential Question  | Performance Expectations  |  | CCSS ELA                        |   | CCSS Math                         |   |
| How are waves both helpful and harmful?                               | <i>Students who demonstrate understanding can:</i>  |  |                                 | Cite specific textual evidence to support analysis of science and technical texts, attending to the precise details of explanations or descriptions.  | Mathematical Practice             | Reason abstractly and quantitatively.   |
|   | MS-PS4-1: Use mathematical representations to describe a simple model for waves that includes how the amplitude of a wave is related to the energy in a wave.   | Reading in Science and Technical Subjects                              |                                 | Compare and contrast the information gained from experiments, simulations, video, or multimedia sources with that gained from reading a text on the same topic.   |                                   | Model with mathematics  |
|   | MS-PS4-2: Develop and use a model to describe that waves are reflected, absorbed, or transmitted through various materials.   |  |                                 |   | Ratios and Proportional Reasoning | 6.RP.A.1 Understand the concept of a ratio, and use ratio language to describe a ratio between two quantities.  |
|   | MS-PS4-3: Integrate qualitative scientific and technical information to support the claim that digitized signals are a more reliable way to encode and transmit information than analog signals.  |  |                                 | Follow precisely a multi-step procedure when carrying out experiments, taking measurements, or performing technical tasks.  |                                   | 7.RP.A.1 Recognize and represent proportional relationships between quantities.   |
|   |   | Writing in History/Social Studies, Science, and Technological Subjects |                                 | Draw evidence from informational texts to support analysis, reflection, and research.   |                                   |   |
| Unit: Reproduction  |   |  |                                 |   |                                   |   |
| Essential Question  | Performance Expectations  |  | CCSS ELA                        |   | CCSS Math                         |   |
|   | <i>Students who demonstrate understanding can:</i>  |  |                                 | Integrate quantitative or technical information expressed in words in a text with a version of that information expressed visually (e.g., in a flowchart, diagram, model, graph, or table).                                 |                                   | Reason abstractly and quantitatively.   |



|  |   |  |   |  |  |   |
|--|---|--|---|--|--|---|
| What are the ethical issues involved in using genetic information? |   |  |   | Cite specific textual evidence to support analysis of science and technical texts, attending to the precise details of explanations or descriptions. | Mathematical Practice  | Model with mathematics.   |
|  | MS-LS1-4: Use argument based on empirical evidence and scientific reasoning to support an explanation for how characteristic animal behaviors and specialized plant structures affect the probability of successful reproduction of animals and plants, respectively. | Reading in Science and Technical Subjects  |   | Determine the central ideas or conclusions of a text; provide an accurate summary of the text distinct from prior knowledge or opinions.             | Statistics and Probability   | GSP.A.2 Understand that a set of data collected to answer a statistical question has a distribution that can be described by its center, spread, and overall shape. |
|  | MS-LS1-5: Construct a scientific explanation based on evidence for how environmental and genetic factors influence the growth of organisms.   |  | Follow precisely a multi-step procedure when carrying out experiments, taking measurements, or performing technical tasks.  | GSP.B.4 Display numerical data in plots on a number line, including dot plots, histograms, and box plots.  |  |   |
|  | MS-LS3-1: Develop and use a model to describe why structural changes to genes (mutations) located on chromosomes may affect proteins and may result in harmful, beneficial, or neutral effects to the structure and function of an organism.                          |  | Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 6–8 texts and topics.  |  | 6SP.B.5 Summarize numerical data sets in relation to their context.  |   |
|  | MS-LS3-2: Develop and use a model to describe why asexual reproduction results in offspring with identical genetic information and sexual reproduction results in offspring with genetic variation.   | Reading Informational Text   | Trace and evaluate the argument and specific claims in a text, distinguishing claims that are supported by reasons and evidence from claims that are not.   | Ratios and Proportional Reasoning  | 6RPA.1 Understand the concept of a ratio, and use ratio language to describe a ratio between two quantities. |   |
|  |   | Writing in History/Social Studies, Science, and Technological Subjects   | Write informative/explanatory texts to examine and convey ideas, concepts, and information through the selection, organization, and analysis of relevant content.<br>Write arguments focused on discipline-specific content.<br>Draw evidence from informational texts to support analysis, reflection, and research. |  |  |   |
|  |   | Speaking and listening   | Engage effectively in a range of collaborative discussions.   |  |  |   |
| Unit: Evolution  |   |  |   |  |  |   |
| Essential Question   | Performance Expectations  |  | CCSS ELA  |  | CCSS Math  |   |
| How are people affected by and affecting evolution?                | Students who demonstrate understanding can:   |  |   | Follow precisely a multi-step procedure when carrying out experiments, taking measurements, or performing technical tasks.                           | Mathematical Practice  | Reason abstractly and quantitatively.   |
|  | MS-LS3-1: Develop and use a model to describe why structural changes to genes (mutations) located on chromosomes may affect proteins and may result in harmful, beneficial, or neutral effects to the structure and function of the organism.                         | Reading in Science and Technical Subjects  |   | Cite specific textual evidence to support analysis of science and technical texts, attending to the precise details of explanations or descriptions. | Ratios and Proportional Reasoning  | Model with mathematics.   |
|  | MS-LS4-1: Analyze and interpret data for patterns in the fossil record that document the existence, diversity, extinction, and change of life forms throughout the history of life on Earth under the assumption that natural laws operate today as in the past.      |  | Determine the central ideas or conclusions of a text; provide an accurate summary of the text distinct from prior knowledge or opinions.  | 6RPA.1 Understand the concept of a ratio, and use ratio language to describe a ratio between two quantities.   |  |   |
|  | MS-LS4-2: Apply scientific ideas to construct an explanation for the anatomical similarities and differences among modern organisms and between modern and fossil organisms to infer evolutionary relationships.  |  | Integrate quantitative or technical information expressed in words in a text with a version of that information expressed visually (e.g., in a flowchart, diagram, model, graph, or table).   | Statistics and Probability   | 6SP.B.5 Summarize numerical data sets in relation to their context.  |   |
|  | MS-LS4-3: Analyze displays of pictorial data to compare patterns of similarities in the embryological development across multiple species to identify relationships not evident in the fully formed anatomy.  | Writing in History/Social Studies, Science, and Technological Subjects   | Compare and contrast the information gained from experiments, simulations, video, or multimedia sources with that gained from reading a text on the same topic.   |  |  |   |
|  | MS-LS4-4: Construct an explanation based on evidence that describes how genetic variations of traits in a population increase some individuals' probability of surviving and reproducing in a specific environment.   |  | Draw evidence from informational texts to support analysis, reflection, and research.   |  |  |   |
|  | MS-LS4-5: Gather and synthesize information about the technologies that have changed the way humans influence the inheritance of desired traits in organisms.   | Speaking and listening   | Gather relevant information from multiple print and digital sources, using search terms effectively; assess the credibility and accuracy of each source; quote or paraphrase the data and conclusions of others while avoiding plagiarism and following a standard format for citation.                               |  |  |   |
|  | MS-LS4-6: Use mathematical representations to support explanations of how natural selection may lead to increases and decreases of specific traits in populations over time.  |  | Write informative/explanatory texts to examine and convey ideas, concepts, and information through the selection, organization, and analysis of relevant content.   |  |  |   |
|  |   | Engage effectively in a range of collaborative discussions (e.g., one-on-one, in groups, teacher led) with diverse partners on grade 8 topics, texts, and issues, building on others' ideas and expressing their own clearly.            |   |  |  |   |
|  |   | Present claims and findings, emphasizing salient points in a focused, coherent manner with relevant evidence, sound and valid reasoning, and well-chosen details: use appropriate eye contact, adequate volume, and clear pronunciation. |   |  |  |   |
| Unit: Solar System and Beyond                                      |   |  |   |  |  |   |
| Essential Question   | Performance Expectations  |  | CCSS ELA  |  | CCSS Math  |   |
| What kinds of future space missions should we fund and conduct?    | Students who demonstrate understanding can:   |  |   | Determine the central ideas or conclusions of a text; provide an accurate summary of the text distinct from prior knowledge or opinions.             | Mathematical Practice  | Reason abstractly and quantitatively.   |
|  | MS-ESS1-1: Develop and use a model of the Earth-sun-moon system to describe the cyclic patterns of lunar phases, eclipses of the sun and moon, and seasons.   | Reading in Science and Technical Subjects  |   | Cite specific textual evidence to support analysis of science and technical texts, attending to the precise details of explanations or descriptions. | Ratios and Proportional Reasoning  | Model with mathematics.   |
|  | MS-ESS1-2: Develop and use a model to describe the role of gravity in the motions within galaxies and the solar system.   |  | Write informative/explanatory texts to examine and convey ideas, concepts, and information through the selection, organization, and analysis of relevant content.   | 6RPA.1 Understand the concept of a ratio, and use ratio language to describe a ratio between two quantities.   |  |   |
|  | MS-ESS1-3: Analyze and interpret data to determine scale properties of objects in the solar system.   |  | Draw evidence from informational texts to support analysis, reflection, and research.   | Statistics and Probability   | 6RPA.3 Use ratio and rate reasoning to solve real-world and mathematical problems.                           |   |
|  |   | Writing in History/Social Studies, Science, and Technological Subjects   | Present claims and findings, emphasizing salient points in a focused, coherent manner with relevant evidence, sound and valid reasoning, and well-chosen details: use appropriate eye contact, adequate volume, and clear pronunciation.  |  | 6SP.B.5 Summarize numerical data sets in relation to their context.  |   |
|  |   |  | Integrate multimedia and visual displays into presentations to clarify information, strengthen claims and evidence, and add interest.   |  |  |   |
| Social and Emotional Standards                                     |   |  | ISTE Standards  |  |  |   |
| Self-Awareness and Self-Management                                 | SEL.8.1C.1 Set a goal that you could achieve in a month or two related to an area of interest (eg, a sport, hobby, musical instrument, etc).  | Empowered Learner  | Students leverage technology to take an active role in choosing, achieving and demonstrating competency in their learning goals, informed by the learning sciences.   |  |  |   |
|  | SEL.8.1C.2 Establish action steps and timeframes toward achievement of this goal.   | Creative Communicator  | Students communicate clearly and express themselves creatively for a variety of purposes using the platforms, tools, styles, formats and digital media appropriate to their goals.  |  |  |   |
|  | SEL.8.1C.3 Identify people who can help you achieve your goal and ask for help.   | Computational Thinker  | Students develop and employ strategies for understanding and solving problems in ways that leverage the power of technological methods to develop and test solutions.   |  |  |   |
|  | SEL.8.1C.4 Monitor progress on achieving your goal and make adjustments in your plan as needed.   |  |   |  |  |   |
|  | SEL.8.1C.5 Evaluate your level of goal achievement, identifying factors that contributed or detracted from it.  |  |   |  |  |   |
| Social-Awareness and Relationship Skills                           | SEL.8.2A.1 Analyze why both parties in a conflict feel as they do.  | Knowledge Constructor  | Students critically curate a variety of resources using digital tools to construct knowledge, produce creative artifacts and make meaningful learning experiences for themselves and others.  |  |  |   |
|  | SEL.8.2A.2 Recognize actions that hurt others.  | Digital Citizen  | Students recognize the rights, responsibilities and opportunities of living, learning and working in an interconnected digital world, and they act and model in ways that are safe, legal and ethical.  |  |  |   |
|  | SEL.8.2A.3 Acknowledge the contributions of others.   |  |   |  |  |   |
|  | SEL.8.2A.4 Provide support to others who are experiencing problems.   |  |   |  |  |   |
|  | SEL.8.2B.1 Analyze the consequences of ignoring the rights of other people.   | Global Collaborator  | Students use digital tools to broaden their perspectives and enrich their learning by collaborating with others and working effectively in teams locally and globally.  |  |  |   |
| Responsible Decision-Making  | SEL.8.3B.1 Recognize the influence of peers on your social success.   | Innovative Designer  | Students use a variety of technologies within a design process to identify and solve problems by creating new, useful or imaginative solutions.   |  |  |   |