

Secret Communications: Sharing Concealed Messages National Standards Alignment

NGSS • COMMON CORE MATH • COMMON CORE ELA

Next Generation Science Standards

Performance Expectations

- 4-PS3-4:** Apply scientific ideas to design, test, and refine a device that converts energy from one form to another.
- MS-LS1-8:** Gather and synthesize information that sensory receptors respond to stimuli by sending messages to the brain for immediate behavior or storage as memories.
- MS-PS2-3:** Ask questions about data to determine the factors that affect the strength of electric and magnetic forces.
- 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.
- HS-LS1-1:** Construct an explanation based on evidence for how the structure of DNA determines the structure of proteins, which carry out the essential functions of life through systems of specialized cells.

Disciplinary Core Ideas

- MS-PS2.B:** Electric and magnetic (electromagnetic) forces can be attractive or repulsive, and their sizes depend on the magnitudes of the charges, currents, or magnetic strengths involved and on the distances between the interacting objects.
- MS-PS4.C:** Digitized signals (sent as wave pulses) are a more reliable way to encode and transmit information.
- HS-LS1.A:** Systems of specialized cells within organisms help them perform the essential functions of life. 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, which carry out most of the work of cells. Multicellular organisms have a hierarchical structure organization, in which any one system is made up of numerous parts and is itself a component of the next level. Feedback mechanisms maintain a living system's internal conditions within certain limits and mediate behaviors, allowing it to remain alive and functional even as external conditions change within some range. Feedback mechanisms can encourage (through positive feedback) or discourage (through negative feedback) what is going on inside the living system.

Mathematical Practices

- MP1:** Make sense of problems and persevere in solving them.
- MP2:** Reason abstractly and quantitatively.
- MP3:** Construct viable arguments and critique the reasoning of others.
- MP4:** Model with mathematics.
- MP5:** Use appropriate tools strategically.
- MP6:** Attend to precision.
- MP7:** Look for and make use of structure.
- MP8:** Look for and express regularity in repeated reasoning.

Common Core State Standards Mathematics

- 6.R.P.A:** Understand ratio concepts and use ratio reasoning to solve problems.
- 6.RP.A.3:** Use ratio and rate reasoning to solve real-world and mathematical problems, e.g., by reasoning about tables of equivalent ratios, tape diagrams, double number line diagrams, or equations.
- 6.NS.B:** Compute fluently with multi-digit numbers and find common factors and multiples.
- 6.NS.B.4:** Find the greatest common factor of two whole numbers less than or equal to 100 and the least common multiple of two whole numbers less than or equal to 12. Use the distributive property to express a sum of two whole numbers 1–100 with a common factor as a multiple of a sum of two whole numbers with no common factor. For example, express $36 + 8$ as $4(9 + 2)$.
- 6.EE.A:** Apply and extend previous understandings of arithmetic to algebraic expressions.
- 6.EE.A.1:** Write and evaluate numerical expressions involving whole-number exponents.
- 6.EE.A.2.C:** Evaluate expressions at specific values for their variables. Include expressions that arise from formulas in real-world problems. Perform arithmetic operations, including those involving whole-number exponents, in the conventional order when there are no parentheses to specify a particular order (Order of Operations). For example, use the formulas $V = s^3$ and $A = 6s^2$ to find the volume and surface area of a cube with sides of length $s = \frac{1}{2}$.
- 6.EE.C:** Represent and analyze quantitative relationships between dependent and independent variables.
- 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. For example, in a problem involving motion at constant speed, list and graph ordered pairs of distances and times, and write the equation $d = 65t$ to represent the relationship between distance and time.
- 6.SP.B:** Summarize and describe distributions.
- 6.SP.B.5:** Summarize numerical data sets in relation to their context.
- 6.SP.B.5.C:** Giving quantitative measures of center (median and/or mean) and variability (interquartile range and/or mean absolute deviation), as well as describing any overall pattern and any striking deviations from the overall pattern with reference to the context in which the data was gathered.
- 7.NS.A.1.B:** Understand $p + q$ as the number located a distance $|q|$ from p , in the positive or negative direction depending on whether q is positive or negative. Show that a number and its opposite have a sum of 0 (are additive inverses). Interpret sums of rational numbers by describing real-world contexts.
- 7.NS.A.1.D:** Apply properties of operations as strategies to add and subtract rational numbers.
- 7.NS.A.2:** Apply and extend previous understandings of multiplication and division and of fractions to multiply and divide rational numbers.
- 7.NS.A.3:** Solve real-world and mathematical problems involving the four operations with rational numbers.
- 7.EE.A:** Use properties of operations to generate equivalent expressions.
- 7.EE.A.1:** Apply properties of operations as strategies to add, subtract, factor, and expand linear expressions with rational coefficients.
- 7.EE.B:** Solve real-life and mathematical problems using numerical and algebraic expressions and equations.
- 7.EE.B.4:** Use variables to represent quantities in a real-world or mathematical problem, and construct simple equations and inequalities to solve problems by reasoning about the quantities.
- 7.SP.A:** Use random sampling to draw inferences about a population.
- 7.SP.A.1:** Understand that statistics can be used to gain information about a population by examining a sample of the population; generalizations about a population from a sample are valid only if the sample is representative of that population. Understand that random sampling tends to produce representative samples and support valid inferences.
- 7.SP.C.8.B:** Represent sample spaces for compound events using methods such as organized lists, tables and tree diagrams. For an event described in everyday language (e.g., “rolling double sixes”), identify the outcomes in the sample space which compose the event.
- 8.F.A:** Define, evaluate, and compare functions.
- 8.F.A.1:** Understand that a function is a rule that assigns to each input exactly one output. The graph of a function is the set of ordered pairs consisting of an input and the corresponding output.
- 8.G.B:** Understand and apply the Pythagorean Theorem.

- 8.G.B.8:** Apply the Pythagorean Theorem to find the distance between two points in a coordinate system.
- HSA.REI.C:** Solve systems of equations.
- HSA.REI.C.6:** Solve systems of linear equations exactly and approximately (e.g., with graphs), focusing on pairs of linear equations in two variables.
- HSS.C.P.B:** Use the rules of probability to compute probabilities of compound events.
- HSS.CP.B.9:** Use permutations and combinations to compute probabilities of compound events and solve problems.

Common Core State Standards English Language Arts

- RI.6.7:** Integrate information presented in different media or formats (e.g., visually, quantitatively) as well as in words to develop a coherent understanding of a topic or issue.
- RI.7.7:** Compare and contrast a text to an audio, video, or multimedia version of the text, analyzing each medium's portrayal of the subject (e.g., how the delivery of a speech affects the impact of the words).
- RI.8.7:** Evaluate the advantages and disadvantages of using different mediums (e.g., print or digital text, video, multimedia) to present a particular topic or idea.
- SL.6.1:** Engage effectively in a range of collaborative discussions with diverse partners on grade 6 topics, texts, and issues, building on others' ideas and expressing their own clearly.
- SL.6.2:** Interpret information presented in diverse media and formats (e.g., visually, quantitatively, orally) and explain how it contributes to a topic, text, or issue under study.
- SL.7.1:** Engage effectively in a range of collaborative discussions with diverse partners on grade 7 topics, texts, and issues, building on others' ideas and expressing their own clearly.
- SL.8.1:** Engage effectively in a range of collaborative discussions with diverse partners on grade 8 topics, texts, and issues, building on others' ideas and expressing their own clearly.
- SL.8.2:** Analyze the purpose of information presented in diverse media formats (e.g., visually, quantitatively, orally) and evaluate the motives (e.g., social, commercial, political) behind its presentation.
- RST.6-8.1:** Cite specific textual evidence to support analysis of science and technical texts.
- RST.6-8.3:** Follow precisely a multistep procedure when carrying out experiments, taking measurements, or performing technical tasks.
- RST.6-8.7:** 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).