



# Mars: Manifest Destiny

## National Standards Alignment

**NGSS • COMMON CORE MATH • COMMON CORE ELA**

### NGSS Science and Engineering Practices

- SEP1:** Asking Questions and Defining Problems
- SEP2:** Developing and Using Models
- SEP3:** Planning and Carrying out Investigations
- SEP4:** Analyzing and Interpreting Data
- SEP5:** Using Mathematics and Computational Thinking
- SEP6:** Constructing Explanations and Designing Solutions
- SEP7:** Engaging in Argument from Evidence
- SEP8:** Obtaining, Evaluating, and Communicating Information

### Next Generation Science Standards

#### Performance Expectations

- MS-ESS1-2:** Develop and use a model to describe the role of gravity in the motions within galaxies and the solar system.
- MS-ESS1-3:** Analyze and interpret data to determine scale properties of objects in the solar system.
- MS-ESS3-3:** Apply scientific principles to design a method for monitoring and minimizing a human impact on the environment.
- 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.
- MS-ETS1-2:** Evaluate competing design solutions using a systemic process to determine how well they meet the criteria and constraints of the problem.
- 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.
- 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.
- 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.
- MS-PS3-3:** Apply scientific principles to design, construct, and test a device that either minimizes or maximizes thermal energy transfer.

### Common Core State Standards 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.

Next Generation Science Standards and NGSS are registered trademarks of Achieve. Neither Achieve nor the lead states and partners that developed the Next Generation Science Standards were involved in the production of this product, and do not endorse it.

DC11426

## Common Core State Standards Mathematics

- 6.EE.B.6:** Use variables to represent numbers and write expressions when solving a real-world or mathematical problem; understand that a variable can represent an unknown number, or, depending on the purpose at hand, any number in a specified set.
- 6.EE.B.7:** Solve real-world and mathematical problems by writing and solving equations of the form  $x + p = q$  and  $px = q$  for cases in which  $p$ ,  $q$  and  $x$  are all nonnegative rational numbers.
- 6.NS.C.8:** Solve real-world and mathematical problems by graphing points in all four quadrants of the coordinate plane. Include use of coordinates and absolute value to find distances between points with the same first coordinate or the same second coordinate.
- 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. For example “This recipe has a ratio of 3 cups of flour to 4 cups of sugar, so there is  $3/4$  cup of flour for each cup of sugar.” “We paid \$75 for 15 hamburgers, which is a rate of \$5 per hamburger.”
- 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.G.A.2:** Find the volume of a right rectangular prism with fractional edge lengths by packing it with unit cubes of the appropriate unit fraction edge lengths, and show that the volume is the same as would be found by multiplying the edge lengths of the prism. Apply the formulas  $V = lwh$  and  $V = bh$  to find volumes of right rectangular prisms with fractional edge lengths in the context of solving real-world and mathematical problems.
- 6.G.A.4:** Represent three-dimensional figures using nets made up of rectangles and triangles, and use the nets to find the surface area of these figures. Apply these techniques in the context of solving real-world and mathematical problems.
- 7.G.A.1:** Solve problems involving scale drawings of geometric figures, including computing actual lengths and areas from a scale drawing and reproducing a scale drawing at a different scale.
- 7.G.B.4:** Know the formulas for the area and circumference of a circle and use them to solve problems; give an informal derivation of the relationship between the circumference and area of a circle.
- 7.G.B.6:** Solve real-world and mathematical problems involving area, volume and surface area of two- and three-dimensional objects composed of triangles, quadrilaterals, polygons, cubes, and right prisms.
- 7.RP.A.2:** Recognize and represent proportional relationships between quantities.
- 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.
- 8.G.C.9:** Know the formulas for the volumes of cones, cylinders, and spheres and use them to solve real-world and mathematical problems.

## Common Core State Standards English Language Arts

- 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 (one-on-one, in groups, and teacher-led) with diverse partners on grade 6 topics, texts, and issues, building on others’ ideas and expressing their own clearly.
- SL.7.1:** Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) 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 (one-on-one, in groups, and teacher-led) 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 and formats (e.g., visually, quantitatively, orally) and evaluate the motives (e.g., social, commercial, political) behind its presentation.
- SL.8.3:** Delineate a speaker’s argument and specific claims, evaluating the soundness of the reasoning and relevance and sufficiency of the evidence and identifying when irrelevant evidence is introduced.
- SL.8.5:** Integrate multimedia and visual displays into presentations to clarify information, strengthen claims and evidence, and add interest.
- RST.6-8.3:** Follow precisely a multistep procedure when carrying out experiments, taking measurements, or performing technical tasks.
- RST.6-8.4:** 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.
- W.6.1:** Write arguments to support claims with clear reasons and relevant evidence.

- W.6.2:** Write informative/explanatory texts to examine a topic and convey ideas, concepts, and information through the selection, organization, and analysis of relevant content.
- W.6.3:** Write narratives to develop real or imagined experiences or events using effective technique, relevant descriptive details and well-structured event sequences.
- W.7.3:** Write narratives to develop real or imagined experiences or events using effective technique, relevant descriptive details and well-structured event sequences.
- W.8.3:** Write narratives to develop real or imagined experiences or events using effective technique, relevant descriptive details and well-structured event sequences.
- WHST.6-8.1:** Write arguments based on discipline-specific content.