

Common Core State Standards Alignment for *Hands-On Engineering*

Grade Level	Common Core State Standards in Mathematics and Next Generation Science Standards
CCSS Math, Grade 4	4.OA.A Use the four operations with whole numbers to solve problems.
	4.NBT.B Use place value understanding and properties of operations to perform multi-digit arithmetic.
	4.MD.A Solve problems involving measurement and conversion of measurements.
CCSS Math, Grade 5	5.NBT.B Perform operations with multi-digit whole numbers and with decimals to hundredths.
	5.MD.A Convert like measurement units within a given measurement system.
	5.MD.C Geometric measurement: understand concepts of volume.
	5.G.A Graph points on the coordinate plane to solve real-world and mathematical problems.
CCSS Math, Grade 6	6.RP.A Understand ratio concepts and use ratio reasoning to solve problems.
	6.G.A Solve real-world and mathematical problems involving area, surface area, and volume.
	6.EE.B Reason about and solve one-variable equations and inequalities.
	6.SP.B Summarize and describe distributions.
CCSS Math, Grade 7	7.RP.A Analyze proportional relationships and use them to solve real-world and mathematical problems.
	7.G.B Solve real-life and mathematical problems involving angle measure, area, surface area, and volume.
CCSS Math, Grade 8	8.G.A Understand congruence and similarity using physical models, transparencies, or geometry software.
	8.G.C Solve real-world and mathematical problems involving volume of cylinders, cones, and spheres.
	8.SP.A Investigate patterns of association in bivariate data.

HANDS-ON ENGINEERING

Grade Level	Common Core State Standards in Mathematics and Next Generation Science Standards
NGSS, Grade 4	4-PS3-1. Use evidence to construct an explanation relating the speed of an object to the energy of that object.
	4-PS3-2. Make observations to provide evidence that energy can be transferred from place to place by sound, light, heat, and electric currents.
	4-PS3-3. Ask questions and predict outcomes about the changes in energy that occur when objects collide.
	4-ESS3-1. Obtain and combine information to describe that energy and fuels are derived from natural resources and their uses affect the environment.
	4-ESS3-2. Generate and compare multiple solutions to reduce the impacts of natural Earth processes on humans.
NGSS, Grade 5	5-PS2-1. Support an argument that the gravitational force exerted by Earth on objects is directed down.
	5-ESS3-1. Obtain and combine information about ways individual communities use science ideas to protect the 3-5-ETS1-1. Define a simple design problem reflecting a need or a want that includes specified criteria for success and constraints on materials, time, or cost.
	5-ETS1-2. Generate and compare multiple possible solutions to a problem based on how well each is likely to meet the criteria and constraints of the problem.
	5-ETS1-3. Plan and carry out fair tests in which variables are controlled and failure points are considered to identify aspects of a model or prototype that can be improved.
NGSS, Middle School	MS-ESS3-3. Apply scientific principles to design a method for monitoring and minimizing a human impact on the environment.
	MS-ESS3-5. Ask questions to clarify evidence of the factors that have caused the rise in global temperatures over the past century.
	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-ETS1-4. 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.

Key—Mathematics: OA=Operations & Algebraic Thinking; NBT=Number & Operations in Base Ten; MD=Measurement & Data; G=Geometry; RP= Ratios & Proportional Relationships; EE=Expressions & Equations; SP=Statistics & Probability

Key—Science: PS=Physical Sciences; ESS=Earth and Space Sciences; ETS=Engineering, Technology, and Applications of Science