**Engineering Everywhere**

**Recommended for Grades 6-8**

**Next Generation Science Standards**

All Engineering Everywhere Units Address These Engineering Standards: (Define the criteria and constraints; evaluate competing solutions; analyze data; develop a model)

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 systematic 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.

**Don’t Run Off: Engineering an Urban Landscape**

MS-LS2-1 Analyze and interpret data to provide evidence for the effects of resource availability on organisms and populations of organisms in an ecosystem.

MS-LS2-4 Construct an argument supported by empirical evidence that changes to physical or biological components of an ecosystem affect populations

MS-LS2-5 Evaluate competing design solutions for maintaining biodiversity and ecosystem services.

MS-ESS3-3 Apply scientific principles to design a method for monitoring and minimizing a human impact on the environment

MS-ESS3-4 Construct an argument supported by evidence for how increases in human population and per-capita consumption of natural resources impact Earth’s systems.

**Food for Thought: Engineering Ice Cream**

MS-PS1-2 Analyze and interpret data on the properties of substances before and after the substances interact to determine if a chemical reaction has occurred.

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**Growing Up: Engineering Vertical Farming**

MS-PS4-2 Develop and use a model to describe that waves are reflected, absorbed, or transmitted through various objects.

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.

MS-LS1-6 Construct a scientific explanation based on evidence for the role of photosynthesis in the cycling of matter and flow of energy into and out of organisms

MS-LS2-5 Evaluate competing design solutions for maintaining biodiversity and ecosystem services.

MS-ESS3-3 Apply scientific principles to design a method for monitoring and minimizing a human impact on the environment.

MS-ESS3-4 Construct an argument supported by evidence for how increases in human population and per-capita consumption of natural resources impact Earth’s systems.

**Go Fish: Engineering Prosthetic Tails**

No Science standards are specified for this unit

**Here Comes the Sun: Engineering Insulated Homes**

MS-PS1-4 Develop a model that predicts and describes changes in particle motion, temperature, and state of a pure substance when thermal energy is added or removed.

MS-PS3-3 Apply scientific principles to design, construct, and test a device that either minimizes or maximizes thermal energy transfer

MS-PS3-4 Plan an investigation to determine the relationships among the energy transferred, the type of matter, the mass, and the change in the average kinetic energy of the particles as measured by the temperature of the sample.

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MS-ESS3-3 Apply scientific principles to design a method for monitoring and minimizing a human impact on the environment.

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**It’s About Time: Engineering Timers**

No Science standards are specified for this unit

**It’s in the Bag: Engineering Bioinspired Gear**

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

**Outbreak Alert: Engineering a Pandemic Response**

MS-LS1-1 Conduct an investigation to provide evidence that living things are made of cells; either one cell or many different numbers and types of cells.

MS-LS3-1 Develop and use a model to describe why structural changes of genes (mutations) may affect proteins and may result in harmful, beneficial, or neutral effects to the structure and function

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**Plants to Plastics: Engineering Bioplastics**

MS-PS1-2 Analyze and interpret data on the properties of substances before and after the substances interact to determine if a chemical reaction has occurred.

MS-PS1-3 Gather and make sense of information to describe that synthetic materials come from natural resources and impact society

MS-ESS3-3. Apply scientific principles to design a method for monitoring and minimizing a human impact on the environment.

**Put a Lid On It: Engineering Safety Helmets**

MS-PS2-1 Apply Newton’s Third Law to design a solution to a problem involving the motion of two colliding objects.

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