

FOSS Next Generation 6-8 Scope and Sequence At-A-Glance

for the Pennsylvania Science, Technology & Engineering, Environmental Literacy and Sustainability (STEELS) Standards

INTEGRATED MIDDLE GRADES SCIENCE					
6	Weather and Water		Diversity of Life		Human Systems Interactions
	3.2.6-8.B • 3.2.6-8.M • 3.2.6-8.N • 3.2.6-8.O • 3.3.6-8.A • 3.3.6-8.H • 3.3.6-8.I • 3.3.6-8.J • 3.3.6-8.L • 3.3.6-8.M • 3.3.6-8.N • 3.3.6-8.O 3.4.6-8.B • 3.4.6-8.E • 3.4.6-8.G • 3.4.6-8.H • 3.4.6-8.I 3.5.6-8.B • 3.5.6-8.D • 3.5.6-8.H • 3.5.6-8.J • 3.5.6-8.N • 3.5.6-8.P • 3.5.6-8.Q • 3.5.6-8.R • 3.5.6-8.S • 3.5.6-8.U • 3.5.6-8.V • 3.5.6-8.W • 3.5.6-8.X • 3.5.6-8.AA • 3.5.6-8.BB • 3.5.6-8.CC • 3.5.6-8.DD • 3.5.6-8.FF • 3.5.6-8.GG • 3.5.6-8.II • 3.5.6-8.JJ		3.1.6-8.A • 3.1.6-8.B • 3.1.6-8.C • 3.1.6-8.D • 3.1.6-8.E • 3.1.6-8.N 3.4.6-8.E 3.5.6-8.CC • 3.5.6-8.DD		3.1.6-8.C • 3.1.6-8.G • 3.1.6-8.H
7	Earth History		Chemical Interactions		Populations and Ecosystems
	3.1.6-8.O • 3.3.6-8.D • 3.3.6-8.E • 3.3.6-8.F • 3.3.6-8.G • 3.3.6-8.K • 3.3.6-8.L • 3.3.6-8.M • 3.3.6-8.N • 3.3.6-8.O		3.2.6-8.A • 3.2.6-8.B • 3.2.6-8.C • 3.2.6-8.D • 3.2.6-8.E • 3.2.6-8.F • 3.2.6-8.M • 3.2.6-8.N • 3.2.6-8.O 3.5.6-8.B • 3.5.6-8.H • 3.5.6-8.I • 3.5.6-8.L • 3.5.6-8.M • 3.5.6-8.N • 3.5.6-8.O • 3.5.6-8.P • 3.5.6-8.Q • 3.5.6-8.R • 3.5.6-8.T • 3.5.6-8.U • 3.5.6-8.W • 3.5.6-8.X • 3.5.6-8.Y • 3.5.6-8.Z • 3.5.6-8.AA • 3.5.6-8.BB • 3.5.6-8.CC • 3.5.6-8.FF • 3.5.6-8.II		3.1.6-8.F • 3.1.6-8.G • 3.1.6-8.I • 3.1.6-8.J • 3.1.6-8.K • 3.1.6-8.L • 3.1.6-8.U • 3.3.6-8.M • 3.3.6-8.N 3.4.6-8.A • 3.4.6-8.C • 3.4.6-8.D • 3.4.6-8.E • 3.4.6-8.G • 3.4.6-8.H • 3.4.6-8.I 3.5.6-8.D • 3.5.6-8.H • 3.5.6-8.I
8	Planetary Science	Gravity and Kinetic Energy†	Waves‡	Electromagnetic Force‡	Heredity and Adaptation‡
	3.3.6-8.A • 3.3.6-8.B • 3.3.6-8.C • 3.3.6-8.E • 3.3.6-8.M • 3.3.6-8.N 3.4.6-8.B 3.5.6-8.E • 3.5.6-8.F • 3.5.6-8.Y • 3.5.6-8.Z • 3.5.6-8.BB	3.2.6-8.G • 3.2.6-8.H • 3.2.6-8.J • 3.2.6-8.L • 3.2.6-8.O • 3.2.6-8.P 3.5.6-8.F • 3.5.6-8.G • 3.5.6-8.I • 3.5.6-8.M • 3.5.6-8.N • 3.5.6-8.O • 3.5.6-8.P • 3.5.6-8.Q • 3.5.6-8.R • 3.5.6-8.T • 3.5.6-8.U • 3.5.6-8.V • 3.5.6-8.W • 3.5.6-8.X • 3.5.6-8.Y • 3.5.6-8.AA • 3.5.6-8.BB • 3.5.6-8.CC • 3.5.6-8.DD • 3.5.6-8.FF • 3.5.6-8.GG • 3.5.6-8.II • 3.5.6-8.KK	3.2.6-8.Q • 3.2.6-8.R • 3.2.6-8.S 3.5.6-8.B • 3.5.6-8.F • 3.5.6-8.G • 3.5.6-8.H • 3.5.6-8.L • 3.5.6-8.M • 3.5.6-8.N • 3.5.6-8.O • 3.5.6-8.P • 3.5.6-8.Q • 3.5.6-8.U • 3.5.6-8.V • 3.5.6-8.W • 3.5.6-8.X • 3.5.6-8.Y • 3.5.6-8.Z • 3.5.6-8.AA • 3.5.6-8.BB • 3.5.6-8.CC • 3.5.6-8.EE • 3.5.6-8.FF • 3.5.6-8.HH • 3.5.6-8.II • 3.5.6-8.JJ • 3.5.6-8.LL	3.2.6-8.H • 3.2.6-8.I • 3.2.6-8.K • 3.2.6-8.O • 3.2.6-8.P • 3.3.6-8.N 3.5.6-8.A • 3.5.6-8.B • 3.5.6-8.C • 3.5.6-8.D • 3.5.6-8.E • 3.5.6-8.F • 3.5.6-8.G • 3.5.6-8.I • 3.5.6-8.K • 3.5.6-8.M • 3.5.6-8.N • 3.5.6-8.O • 3.5.6-8.P • 3.5.6-8.Q • 3.5.6-8.R • 3.5.6-8.S • 3.5.6-8.U • 3.5.6-8.V • 3.5.6-8.W • 3.5.6-8.X • 3.5.6-8.Y • 3.5.6-8.AA • 3.5.6-8.BB • 3.5.6-8.CC • 3.5.6-8.DD • 3.5.6-8.EE • 3.5.6-8.FF • 3.5.6-8.HH • 3.5.6-8.II • 3.5.6-8.JJ • 3.5.6-8.LL	3.1.6-8.M • 3.1.6-8.N • 3.1.6-8.O • 3.1.6-8.P • 3.1.6-8.Q* • 3.1.6-8.R • 3.1.6-8.S • 3.1.6-8.T 3.4.6-8.A • 3.4.6-8.D • 3.4.6-8.F • 3.4.6-8.G • 3.4.6-8.H • 3.4.6-8.I 3.5.6-8.F • 3.5.6-8.S

STANDARDS KEY:

S: 3.1 – Life Science | 3.2 – Physical Science | 3.3 – Earth Science
 ELS: 3.4
 TE: 3.5

* = PA STEELS Science standard with modified wording

‡ = FOSS half-length courses

FOSS Next Generation Middle School Detail Correlation – 6th Grade

SCIENCE	
WEATHER AND WATER	
<p>3.2.6-8.B 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.</p>	<p>Disciplinary Core Ideas PS1.A: Structure and Properties of Matter: Investigation 1 Parts 2 and 3; Investigation 2 Part 1; Investigation 3 Parts 2 and 3; Investigation 6 Part 3; Investigation 7 Part 1; Investigation 10 Part 2</p> <p>Science and Engineering Practices Developing and Using Models: Investigation 1 Parts 2 and 3; Investigation 2 Parts 1 and 2; Investigation 3 Parts 1-3; Investigation 4 Parts 2 and 3; Investigation 5 Parts 1-3; Investigation 6 Parts 1-3; Investigation 7 Parts 2 and 3; Investigation 8 Parts 1 and 3; Investigation 9 Parts 2 and 3; Investigation 10 Part 1</p> <p>Crosscutting Concepts Cause and Effect: Investigation 1 Parts 1-3; Investigation 2 Parts 1 and 2; Investigation 3 Parts 2 and 3; Investigation 4 Parts 2 and 3; Investigation 5 Parts 2 and 3; Investigation 6 Parts 2 and 3; Investigation 7 Parts 1-3; Investigation 8 Parts 2 and 3; Investigation 9 Parts 2 and 3; Investigation 10 Parts 1 and 2</p>
<p>3.2.6-8.M Apply Scientific principles to design, construct, and test a device that either minimizes or maximizes thermal energy transfer.</p>	<p>Disciplinary Core Ideas PS3.A: Definitions of Energy: Investigation 4 Part 3; Investigation 5 Parts 1-3; Investigation 6 Part 3; Investigation 7 Part 3; Investigation 10 Part 2</p> <p>PS3.B: Conservation of Energy and Energy Transfer: Investigation 3 Part 3; Investigation 4 Part 3; Investigation 5 part 3; Investigation 6 Part 3; Investigation 7 Part 3; Investigation 10 Part 2</p> <p>Science and Engineering Practices Constructing Explanations and Designing Solutions: Investigation 5 Parts 1-3; Investigation 9 Parts 2 and 3</p> <p>Crosscutting Concepts Energy and Matter: Investigation 3 Part 2; Investigation 4 Parts 2 and 3; Investigation 5 Parts 1-3; Investigation 6 Parts 2 and 3; Investigation 7 Parts 2 and 3; Investigation 8 Part 3; Investigation 9 Parts 2 and 3</p>

SCIENCE	
WEATHER AND WATER	
<p>3.2.6-8.N 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.</p>	<p>Disciplinary Core Ideas PS3.A: Definitions of Energy: Investigation 4 Part 3; Investigation 5 Parts 1-3; Investigation 6 Part 3; Investigation 7 Part 3; Investigation 10 Part 2 PS3.B: Conservation of Energy and Energy Transfer: Investigation 3 Part 3; Investigation 4 Part 3; Investigation 5 part 3; Investigation 6 Part 3; Investigation 7 Part 3; Investigation 10 Part 2</p> <p>Science and Engineering Practices Planning and Carrying Out Investigations: Investigation 1 Parts 2 and 3; Investigation 2 Parts 1 and 2; Investigation 3 Parts 1 and 2; Investigation 4 Part 3; Investigation 5 Parts 1-3; Investigation 7 Part 1; Investigation 9 Part 1</p> <p>Crosscutting Concepts Scale, Proportion, and Quantity: Investigation 2 Parts 1 and 2; Investigation 3 Part 3; Investigation 4 Part 2; Investigation 7 Part 3; Investigation 8 Part 1; Investigation 9 Part 1</p>
<p>3.2.6-8.O Construct, use, and present arguments to support the claim that when the kinetic energy of an object changes, energy is transferred to or from the object.</p>	<p>Disciplinary Core Ideas PS3.B: Conservation of Energy and Energy Transfer: Investigation 3 Part 3; Investigation 4 Part 3; Investigation 5 part 3; Investigation 6 Part 3; Investigation 7 Part 3; Investigation 10 Part 2</p> <p>Science and Engineering Practices Engaging in Argument from Evidence: Investigation 1 Part 2; Investigation 5 Part 3; Investigation 7 Parts 1 and 2; Investigation 9 Part 3; Investigation 10 Part 1</p> <p>Crosscutting Concepts Energy and Matter: Investigation 3 Part 2; Investigation 4 Parts 2 and 3; Investigation 5 Parts 1-3; Investigation 6 Parts 2 and 3; Investigation 7 Parts 2 and 3; Investigation 8 Part 3; Investigation 9 Parts 2 and 3</p>

SCIENCE

WEATHER AND WATER

3.3.6-8.A

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.

Disciplinary Core Ideas

ESS1.A: The Universe and Its Stars: Investigation 1 Part 3

Science and Engineering Practices

Developing and Using Models: Investigation 1 Parts 2 and 3; Investigation 2 Parts 1 and 2; Investigation 3 Parts 1-3; Investigation 4 Parts 2 and 3; Investigation 5 Parts 1-3; Investigation 6 Parts 1-3; Investigation 7 Parts 2 and 3; Investigation 8 Parts 1 and 3; Investigation 9 Parts 2 and 3; Investigation 10 Part 1

Crosscutting Concepts

Patterns: Investigation 1 Parts 1 and 3; Investigation 2 Part 2; Investigation 3 Parts 1 and 2; Investigation 5 Part 1; Investigation 6 Part 3; Investigation 8 Part 2; Investigation 9 Parts 1 and 3; Investigation 10 Parts 1 and 2

3.3.6-8.H

Develop a model to describe the cycling of water through Earth's systems driven by energy from the sun and the force of gravity.

Disciplinary Core Ideas

ESS2.C: The Roles of Water in Earth's Surface Processes: Investigation 1 Part 1; Investigation 2 Parts 1 and 2; Investigation 3 Part 3; Investigation 6 Part 3; Investigation 7 Parts 2 and 3; Investigation 8 Parts 1-3; Investigation 10 Part 1

Science and Engineering Practices

Developing and Using Models: Investigation 1 Parts 2 and 3; Investigation 2 Parts 1 and 2; Investigation 3 Parts 1-3; Investigation 4 Parts 2 and 3; Investigation 5 Parts 1-3; Investigation 6 Parts 1-3; Investigation 7 Parts 2 and 3; Investigation 8 Parts 1 and 3; Investigation 9 Parts 2 and 3; Investigation 10 Part 1

Crosscutting Concepts

Energy and Matter: Investigation 3 Part 2; Investigation 4 Parts 2 and 3; Investigation 5 Parts 1-3; Investigation 6 Parts 2 and 3; Investigation 7 Parts 2 and 3; Investigation 8 Part 3; Investigation 9 Parts 2 and 3

SCIENCE

WEATHER AND WATER

3.3.6-8.I

Develop and use a model to describe how unequal heating and rotation of the Earth cause patterns of atmospheric and oceanic circulation that determine regional climates.

Disciplinary Core Ideas

ESS2.C: The Roles of Water in Earth’s Surface Processes: Investigation 1 Part 1; Investigation 2 Parts 1 and 2; Investigation 3 Part 3; Investigation 6 Part 3; Investigation 7 Parts 2 and 3; Investigation 8 Parts 1-3; Investigation 10 Part 1

ESS2.D: Weather and Climate: Investigation 1 Part 3; Investigation 2 Part 2; Investigation 3 Part 3; Investigation 4 Parts 1 and 3; Investigation 6 Part 3; Investigation 8 Part 3; Investigation 9 Part 3; Investigation 10 Part 2

Science and Engineering Practices

Developing and Using Models: Investigation 1 Parts 2 and 3; Investigation 2 Parts 1 and 2; Investigation 3 Parts 1-3; Investigation 4 Parts 2 and 3; Investigation 5 Parts 1-3; Investigation 6 Parts 1-3; Investigation 7 Parts 2 and 3; Investigation 8 Parts 1 and 3; Investigation 9 Parts 2 and 3; Investigation 10 Part 1

Crosscutting Concepts

Systems and System Models Investigation 1 Part 2; Investigation 3 Part 3; Investigation 4 Part 2; Investigation 5 Parts 1-3; Investigation 6 Parts 2 and 3; Investigation 7 Parts 1 and 3; Investigation 8 Parts 1 and 3; Investigation 9 Parts 2 and 3; Investigation 10 Part 1

3.3.6-8.J Collect data to provide evidence for how the motions and complex interactions of air masses result in changes in weather conditions.

Disciplinary Core Ideas

ESS2.C: The Roles of Water in Earth’s Surface Processes: Investigation 1 Part 1; Investigation 2 Parts 1 and 2; Investigation 3 Part 3; Investigation 6 Part 3; Investigation 7 Parts 2 and 3; Investigation 8 Parts 1-3; Investigation 10 Part 1

ESS2.D: Weather and Climate: Investigation 1 Part 3; Investigation 2 Part 2; Investigation 3 Part 3; Investigation 4 Parts 1 and 3; Investigation 6 Part 3; Investigation 8 Part 3; Investigation 9 Part 3; Investigation 10 Part 2

Science and Engineering Practices

Planning and Carrying Out Investigations: Investigation 1 Parts 2 and 3; Investigation 2 Parts 1 and 2; Investigation 3 Parts 1 and 2; Investigation 4 Part 3; Investigation 5 Parts 1-3; Investigation 7 Part 1; Investigation 9 Part 1

Crosscutting Concepts

Cause and Effect: Investigation 1 Parts 1-3; Investigation 2 Parts 1 and 2; Investigation 3 Parts 2 and 3; Investigation 4 Parts 2 and 3; Investigation 5 Parts 2 and 3; Investigation 6 Parts 2 and 3; Investigation 7 Parts 1-3; Investigation 8 Parts 2 and 3; Investigation 9 Parts 2 and 3; Investigation 10 Parts 1 and 2

SCIENCE	
WEATHER AND WATER	
<p>3.3.6-8.L Analyze and interpret data on natural hazards to forecast future catastrophic events and inform the development of technologies to mitigate their effects.</p>	<p>Disciplinary Core Ideas ESS3.B: Natural Hazards: Investigation 9 Parts 1-3; Investigation 10 Part 1</p> <p>Science and Engineering Practices Analyzing and Interpreting Data: Investigation 1 Parts 2 and 3; Investigation 2 Parts 1 and 2; Investigation 3 Parts 1-3; Investigation 4 Parts 1-3; Investigation 5 Parts 1-3; Investigation 6 Part 3; Investigation 7 Parts 1-3; Investigation 8 Parts 2 and 3; Investigation 9 Parts 1-3; Investigation 10 Part 1</p> <p>Crosscutting Concepts Patterns: Investigation 1 Parts 1 and 3; Investigation 2 Part 2; Investigation 3 Parts 1 and 2; Investigation 5 Part 1; Investigation 6 Part 3; Investigation 8 Part 2; Investigation 9 Parts 1 and 3; Investigation 10 Parts 1 and 2</p>
<p>3.3.6-8.M Apply scientific principles to design a method for monitoring and minimizing a human impact on the environment.</p>	<p>Disciplinary Core Ideas ESS3.C: Human Impacts on Earth Systems: Investigation 8 Part 3; Investigation 9 Parts 1-3; Investigation 10 Part 2</p> <p>Science and Engineering Practices Constructing Explanations and Designing Solutions: Investigation 5 Parts 1-3; Investigation 9 Parts 2 and 3</p> <p>Crosscutting Concepts Cause and Effect: Investigation 1 Parts 1-3; Investigation 2 Parts 1 and 2; Investigation 3 Parts 2 and 3; Investigation 4 Parts 2 and 3; Investigation 5 Parts 2 and 3; Investigation 6 Parts 2 and 3; Investigation 7 Parts 1-3; Investigation 8 Parts 2 and 3; Investigation 9 Parts 2 and 3; Investigation 10 Parts 1 and 2</p>
<p>3.3.6-8.N Construct an argument supported by evidence for how increases in human population and per-capita consumption of natural resources impact Earth's systems.</p>	<p>Disciplinary Core Ideas ESS3.C: Human Impacts on Earth Systems: Investigation 8 Part 3; Investigation 9 Parts 1-3; Investigation 10 Part 2</p> <p>Science and Engineering Practices Engaging in Argument from Evidence: Investigation 1 Part 2; Investigation 5 Part 3; Investigation 7 Parts 1 and 2; Investigation 9 Part 3; Investigation 10 Part 1</p> <p>Crosscutting Concepts Cause and Effect: Investigation 1 Parts 1-3; Investigation 2 Parts 1 and 2; Investigation 3 Parts 2 and 3; Investigation 4 Parts 2 and 3; Investigation 5 Parts 2 and 3; Investigation 6 Parts 2 and 3; Investigation 7 Parts 1-3; Investigation 8 Parts 2 and 3; Investigation 9 Parts 2 and 3; Investigation 10 Parts 1 and 2</p>

SCIENCE

WEATHER AND WATER

3.3.6-8.O

Ask questions to clarify evidence of the factors that have caused the rise in global temperatures over the past century.

Disciplinary Core Ideas

ESS2.C: The Roles of Water in Earth’s Surface Processes: Investigation 1 Part 1; Investigation 2 Parts 1 and 2; Investigation 3 Part 3; Investigation 6 Part 3; Investigation 7 Parts 2 and 3; Investigation 8 Parts 1-3; Investigation 10 Part 1

ESS2.D: Weather and Climate: Investigation 1 Part 3; Investigation 2 Part 2; Investigation 3 Part 3; Investigation 4 Parts 1 and 3; Investigation 6 Part 3; Investigation 8 Part 3; Investigation 9 Part 3; Investigation 10 Part 2

Science and Engineering Practices

Developing and Using Models: Investigation 1 Parts 2 and 3; Investigation 2 Parts 1 and 2; Investigation 3 Parts 1-3; Investigation 4 Parts 2 and 3; Investigation 5 Parts 1-3; Investigation 6 Parts 1-3; Investigation 7 Parts 2 and 3; Investigation 8 Parts 1 and 3; Investigation 9 Parts 2 and 3; Investigation 10 Part 1

Crosscutting Concepts

Systems and System Models Investigation 1 Part 2; Investigation 3 Part 3; Investigation 4 Part 2; Investigation 5 Parts 1-3; Investigation 6 Parts 2 and 3; Investigation 7 Parts 1 and 3; Investigation 8 Parts 1 and 3; Investigation 9 Parts 2 and 3; Investigation 10 Part 1

ENVIRONMENTAL LITERACY AND SUSTAINABILITY

WEATHER AND WATER

3.4.6-8.B

Analyze and interpret data about how different societies (economic and social systems_ and cultures use and manage natural resources differently.

Disciplinary Core Ideas

ESS3.A: Natural Resources: Investigation 8, Extension Activity

ESS3.C: Human Impacts on Earth Systems: Investigation 8, Extension Activity

Science and Engineering Practices

Analyzing and Interpreting Data: Investigation 8, Extension Activity

Crosscutting Concepts

Cause and Effect: Investigation 8, Extension Activity

3.4.6-8.E

Collect, analyze, and interpret environmental data to describe a local environment.

Disciplinary Core Ideas

LS2.A: Interdependent Relationships in Ecosystems: Investigation 4, Part 1; Investigation 6, Part 3, Investigation 8, Part 3

ESS2.D: Weather and Climate: Investigation 4, Part 1; Investigation 6, Part 3, Investigation 8, Part 3

Science and Engineering Practices

Developing and Using Models: Investigation 4, Part 1; Investigation 6, Part 3, Investigation 8, Part 3

Crosscutting Concepts

Systems and System Models: Investigation 4, Part 1; Investigation 6, Part 3, Investigation 8, Part 3

ENVIRONMENTAL LITERACY AND SUSTAINABILITY

WEATHER AND WATER

3.4.6-8.G

Obtain and communicate information to describe how best resource management practices and environmental laws are designed to achieve environmental sustainability.

Disciplinary Core Ideas

ESS3.C: Human Impacts on Earth Systems: Investigation 9, Part 3

ETS1.B: Developing Possible Solutions: Investigation 9, Part 3

Science and Engineering Practices

Obtaining, Evaluating, and Communicating Information: Investigation 9, Part 3

Crosscutting Concepts

Cause and Effect: Investigation 9, Part 3

Stability and Change: Investigation 9, Part 3

3.4.6-8.H

Design a solution to an environmental issue in which individuals and societies can engage as stewards of the environment.

Disciplinary Core Ideas

ETS1.B: Developing Possible Solutions: Investigation 5, Part 3

ESS3.C: Human Impacts on Earth Systems: Investigation 5, Part 3

Science and Engineering Practices

Constructing Explanations and Designing Solutions: Investigation 5, Part 3

Connections to Nature of Science

Science Addresses Questions About the Natural and Material World: Investigation 5, Part 3

3.4.6-8.I

Construct an explanation that describes regional environmental conditions and their implications on environmental justice and social equity.

Disciplinary Core Ideas

LS4.D: Biodiversity and Humans: Investigation 9, Part 3

Science and Engineering Practices

Obtaining, Evaluating, and Communicating Information: Investigation 9, Part 3

Crosscutting Concepts

Cause and Effect: Investigation 9, Part 3

TECHNOLOGY AND ENGINEERING

WEATHER AND WATER

3.5.6-8.B

Use instruments to gather data on the performance of everyday products.

Disciplinary Core Ideas

ETS1.B: Developing Possible Solutions: Investigation 5, Parts 1-3

Science and Engineering Practices

Using Mathematics and Computational Thinking: Investigation 5, Parts 1-3

Technology and Engineering Practices

Systems Thinking: Investigation 5, Parts 2 and 3

TECHNOLOGY AND ENGINEERING
WEATHER AND WATER

<p>3.5.6-8.D Analyze how the creation and use of technologies consumes renewable, nonrenewable, and inexhaustible resources; creates waste; and may contribute to environmental challenges.</p>	<p>Disciplinary Core Ideas NAEP T.8.7: Compare and Justify Environmental Effects: Investigation 5, Part 3 Reading NAEP T.8.5: Environmental and Economic Trade-Offs: Investigation 5, Part 3 Reading</p> <p>Science and Engineering Practices Engaging in Argument from Evidence: Investigation 5, Part 3 Reading</p> <p>Technology and Engineering Practices Attention to Ethics: Investigation 5, Part 3 Reading</p>
<p>3.5.6-8.H Evaluate trade-offs based on various perspectives as part of a decision process that recognizes the need for careful compromises among competing factors.</p>	<p>Disciplinary Core Ideas ETS1.A: Defining and Delimiting Engineering Problems: Investigation 5, Part 1</p> <p>Science and Engineering Practices Engaging in Argument from Evidence: Investigation 5, Part 3</p> <p>Technology and Engineering Practices Optimism: Investigation 5, Parts 1-3</p>
<p>3.5.6-8.J Use tools, materials, and machines to safely diagnose, adjust, and repair systems.</p>	<p>Disciplinary Core Ideas ETS1.B: Developing Possible Solutions: Investigation 5, Parts 1-3</p> <p>Science and Engineering Practices Constructing Explanations and Designing Solutions: Investigation 5, Part 2</p> <p>Technology and Engineering Practices Making and Doing: Investigation 5, Parts 1-3 Systems Thinking: Investigation 5, Parts 1-3</p>
<p>3.5.6-8.N 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.</p>	<p>Disciplinary Core Ideas ETS1.B: Developing Possible Solutions: Investigation 5, Parts 1-3 ETS1.C: Optimizing the Design Solution: Investigation 5, Part 3</p> <p>Science and Engineering Practices Analyzing and Interpreting Data: Investigation 5, Parts 2 and 3</p> <p>Technology and Engineering Practices Optimism: Investigation 5, Parts 1-3</p>

TECHNOLOGY AND ENGINEERING

WEATHER AND WATER

<p>3.5.6-8.P Evaluate competing design solutions using a systematic process to determine how well they meet the criteria and constraints of the problem.</p>	<p>Disciplinary Core Ideas ETS1.B: Developing Possible Solutions: Investigation 5, Parts 1-3</p> <p>Science and Engineering Practices Engaging in Argument from Evidence: Investigation 5, Part 3</p> <p>Technology and Engineering Practices Critical Thinking: Investigation 5, Parts 1-3</p>
<p>3.5.6-8.Q Apply a technology and engineering design thinking process.</p>	<p>Disciplinary Core Ideas ETS1.B: Developing Possible Solutions: Investigation 5, Parts 1-3</p> <p>Science and Engineering Practices Asking Questions and Defining Problems: Investigation 5, Parts 1-3</p> <p>Technology and Engineering Practices Making and Doing: Investigation 5, Parts 1-3 Creativity: Investigation 5, Parts 1-3</p>
<p>3.5.6-8.R Develop innovative products and systems that solve problems and extend capabilities based on individual or collective needs and wants.</p>	<p>Disciplinary Core Ideas ETS1.B: Developing Possible Solutions: Investigation 5, Parts 1-3</p> <p>Science and Engineering Practices Constructing Explanations and Designing Solutions:</p> <p>Technology and Engineering Practices Making and Doing: Investigation 5, Parts 1-3</p>
<p>3.5.6-8.S Illustrate the benefits and opportunities associated with different approaches to design.</p>	<p>Disciplinary Core Ideas ETS1.B: Developing Possible Solutions: Investigation 5, Parts 1-3</p> <p>Science and Engineering Practices Obtaining, Evaluating, and Communicating Information: Investigation 5, Parts 1-3</p> <p>Technology and Engineering Practices Optimism: Investigation 5, Parts 1-3</p>
<p>3.5.6-8.U Evaluate and assess the strengths and weaknesses of various design solutions given established principles and elements of design.</p>	<p>Disciplinary Core Ideas ETS1.B: Developing Possible Solutions: Investigation 5, Parts 1-3</p> <p>Science and Engineering Practices Engaging in Argument from Evidence: Investigation 5, Part 3</p> <p>Technology and Engineering Practices Optimism: Investigation 5, Parts 1-3</p>

TECHNOLOGY AND ENGINEERING

WEATHER AND WATER

<p>3.5.6-8.V Refine design solutions to address criteria and constraints.</p>	<p>Disciplinary Core Ideas ETS1.A: Defining and Delimiting Engineering Problems: Investigation 5, Part 1</p> <p>Science and Engineering Practices Asking Questions and Defining Problems: Investigation 5, Parts 1-3</p> <p>Technology and Engineering Practices Making and Doing: Investigation 5, Parts 1-3 Optimism: Investigation 5, Parts 1-3</p>
<p>3.5.6-8.W 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.</p>	<p>Disciplinary Core Ideas ETS1.A: Defining and Delimiting Engineering Problems: Investigation 5, Part 1</p> <p>Science and Engineering Practices Asking Questions and Defining Problems: Investigation 5, Parts 1-3</p> <p>Technology and Engineering Practices Critical Thinking: Investigation 5, Parts 1-3</p>
<p>3.5.6-8.X Defend decisions related to a design problem.</p>	<p>Disciplinary Core Ideas ETS1.B: Developing Possible Solutions: Investigation 5, Parts 1-3</p> <p>Science and Engineering Practices Engaging in Argument from Evidence: Investigation 5, Part 3</p> <p>Technology and Engineering Practices Critical Thinking: Investigation 5, Parts 1-3</p>
<p>3.5.6-8.AA Adapt and apply an existing product, system, or process to solve a problem in a different setting.</p>	<p>Disciplinary Core Ideas ETS1.C: Optimizing the Design Solution: Investigation 5, Part 3</p> <p>Science and Engineering Practices Constructing Explanations and Designing Solutions: Investigation 5, Parts 2 and 3</p> <p>Technology and Engineering Practices Making and Doing: Investigation 5, Parts 1-3 Creativity: Investigation 5, Parts 1-3</p>

TECHNOLOGY AND ENGINEERING
WEATHER AND WATER

<p>3.5.6-8.BB Demonstrate how knowledge gained from other content areas affects the development of technological products and systems.</p>	<p>Disciplinary Core Ideas ETS1.C: Optimizing the Design Solution: Investigation 5, Part 3</p> <p>Science and Engineering Practices Obtaining, Evaluating, and Communicating Information: Investigation 5, Parts 1-3</p> <p>Technology and Engineering Practices Making and Doing: Investigation 5, Parts 1-3 Optimism: Investigation 5, Parts 1-3</p>
<p>3.5.6-8.CC Consider historical factors that have contributed to the development of technologies and human progress.</p>	<p>Disciplinary Core Ideas ETS1.B: Developing Possible Solutions: Investigation 4, Part 3 Reading</p> <p>Science and Engineering Practices Asking Questions and Defining Problems: Investigation 4, Part 3 Reading</p> <p>Technology and Engineering Practices Optimism: Investigation 4, Part 3 Reading</p>
<p>3.5.6-8.DD Engage in a research and development process to simulate how inventions and innovations have evolved through systematic tests and refinements.</p>	<p>Disciplinary Core Ideas ETS1.B: Developing Possible Solutions: Investigation 5, Parts 1-3</p> <p>Science and Engineering Practices Asking Questions and Defining Problems: Investigation 5, Parts 1-3</p> <p>Technology and Engineering Practices Optimism: Investigation 5, Parts 1-3</p>
<p>3.5.6-8.FF Demonstrate how systems thinking involves considering relationships between every part, as well as how the systems interact with the environment in which it is used.</p>	<p>Disciplinary Core Ideas NAEP D.8.11: Systems Processes and Goals: Investigation 5, Parts 1-3</p> <p>Science and Engineering Practices Developing and Using Models: Investigation 5, Parts 1-3</p> <p>Technology and Engineering Practices Systems Thinking: Investigation 5, Parts 1-3 Attention to Ethics: Investigation 1, Part 3 Reading</p>
<p>3.5.6-8.GG Create an open-loop system that has no feedback path and requires human intervention.</p>	<p>Disciplinary Core Ideas ETS1.B: Developing Possible Solutions: Investigation 5, Parts 1-3</p> <p>Science and Engineering Practices Developing and Using Models: Investigation 5, Parts 1-3</p> <p>Technology and Engineering Practices Systems Thinking: Investigation 5, Parts 1-3 Making and Doing: Investigation 5, Parts 1-3</p>

TECHNOLOGY AND ENGINEERING
WEATHER AND WATER

<p>3.5.6-8.II Predict outcomes of a future product or system at the beginning of the design process.</p>	<p>Disciplinary Core Ideas ETS1.C: Optimizing the Design Solution: Investigation 5, Part 3</p> <p>Science and Engineering Practices Developing and Using Models: Investigation 5, Parts 1-3</p> <p>Technology and Engineering Practices Systems Thinking: Investigation 5, Parts 1-3 Making and Doing: Investigation 5, Parts 1-3</p>
<p>3.5.6-8.JJ Apply informed problem-solving strategies to the improvement of existing devices or processes or the development of new approaches.</p>	<p>Disciplinary Core Ideas ETS1.C: Optimizing the Design Solution: Investigation 5, Part 3</p> <p>Science and Engineering Practices Asking Questions and Defining Problems: Investigation 5, Parts 1-3</p> <p>Technology and Engineering Practices Making and Doing: Investigation 5, Parts 1-3 Optimism: Investigation 5, Parts 1-3</p>

SCIENCE	
DIVERSITY OF LIFE	
<p>3.1.6-8.A Conduct an investigation to provide evidence that living things are made of cells; either one cell or many different numbers and types of cells.</p>	<p>Disciplinary Core Ideas LS1.A: Structure and Function: Investigation 1 Part 2; Investigation 2 Part 2; Investigation 3 Parts 1-4; Investigation 4 Parts 1-4; Investigation 5 Part 3; Investigation 8 Parts 1 and 2; Investigation 9 Parts 1 and 2</p> <p>Science and Engineering Practices Planning and Carrying Out Investigations: Investigation 1 Part 2; Investigation 2 Parts 1 and 3; Investigation 3 Parts 1-4; Investigation 4 Parts 1-3; Investigation 5 Parts 1-3; Investigation 6 Parts 1-3; Investigation 8 Part 1; Investigation 9 Part 1</p> <p>Crosscutting Concepts Scale, Proportion, and Quantity: Investigation 1 Part 2; Investigation 2 Parts 1-3; Investigation 3 Parts 1-4; Investigation 4 Parts 1, 2 and 4; Investigation 9 Part 1</p>
<p>3.1.6-8.B Develop and use a model to describe the function of a cell as a whole and ways the parts of cells contribute to the function.</p>	<p>Disciplinary Core Ideas LS1.A: Structure and Function: Investigation 1 Part 2; Investigation 2 Part 2; Investigation 3 Parts 1-4; Investigation 4 Parts 1-4; Investigation 5 Part 3; Investigation 8 Parts 1 and 2; Investigation 9 Parts 1 and 2</p> <p>Science and Engineering Practices Developing and Using Models: Investigation 3 Parts 1-2 and 4; Investigation 4 Parts 1 and 4; Investigation 5 Parts 1 and 2; Investigation 7 Part 2</p> <p>Crosscutting Concepts Structure and Function: Investigation 1 Part 2; Investigation 2 Part 3; Investigation 3 Parts 1-4; Investigation 4 Parts 2 and 4; Investigation 5 Parts 2 and 3; Investigation 6 parts 1 and 4; Investigation 8 Parts 1 and 2; Investigation 9 Part 2</p>
<p>3.1.6-8.C Use argument supported by evidence for how the body is a system of interacting systems composed of groups of cells.</p>	<p>Disciplinary Core Ideas LS1.A: Structure and Function: Investigation 1 Part 2; Investigation 2 Part 2; Investigation 3 Parts 1-4; Investigation 4 Parts 1-4; Investigation 5 Part 3; Investigation 8 Parts 1 and 2; Investigation 9 Parts 1 and 2</p> <p>Science and Engineering Practices Engaging in Argument from Evidence: Investigation 1 Parts 1 and 2; Investigation 2 Part 3; Investigation 3 Parts 2 and 3; Investigation 4 Parts 2-4; Investigation 6 Part 4; Investigation 8 Part 2; Investigation 9 Parts 1 and 2</p> <p>Crosscutting Concepts Systems and Systems Models: Investigation 3 Parts 2 and 4; Investigation 4 Parts 1 and 4; Investigation 5 Parts 2 and 3; Investigation 6 Part 3; Investigation 8 Part 2; Investigation 9 Parts 1 and 2</p>

SCIENCE	
DIVERSITY OF LIFE	
<p>3.1.6-8.D 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.</p>	<p>Disciplinary Core Ideas LS1.B Growth and Development of Organisms: Investigation 3 Parts 1-4; Investigation 4 Parts 1-4; Investigation 6 Parts –4; Investigation 7 Parts 1 and 2; Investigation 8 Parts 1 and 2</p> <p>Science and Engineering Practices Engaging in Argument from Evidence: Investigation 1 Parts 1 and 2; Investigation 2 Part 3; Investigation 3 Parts 2 and 3; Investigation 4 Parts 2-4; Investigation 6 Part 4; Investigation 8 Part 2; Investigation 9 Parts 1 and 2</p> <p>Crosscutting Concepts Cause and Effect: Investigation 1 Part 2; Investigation 2 Part 3; Investigation 5 Parts 1 and 3; Investigation 6 Parts 2 and 4; Investigation 7 Parts 1 and 2; Investigation 8 Part 1; Investigation 9 Parts 1 and 2</p>
<p>3.1.6-8.E Construct a scientific explanation based on evidence for how environmental and genetic factors influence the growth of organisms.</p>	<p>Disciplinary Core Ideas LS1.B Growth and Development of Organisms: Investigation 3 Parts 1-4; Investigation 4 Parts 1-4; Investigation 6 Parts –4; Investigation 7 Parts 1 and 2; Investigation 8 Parts 1 and 2</p> <p>Science and Engineering Practices Constructing Explanations and Designing Solutions: Investigation 1 Part 2; Investigation 3 Parts 1-4; Investigation 4 Parts 1-4; Investigation 5 Parts 1-3; Investigation 7 Parts 1 and 2; Investigation 8 Parts 1 and 2; Investigation 9 Part 2</p> <p>Crosscutting Concepts Cause and Effect: Investigation 1 Part 2; Investigation 2 Part 3; Investigation 5 Parts 1 and 3; Investigation 6 Parts 2 and 4; Investigation 7 Parts 1 and 2; Investigation 8 Part 1; Investigation 9 Parts 1 and 2</p>
<p>3.1.6-8.N 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.</p>	<p>Disciplinary Core Ideas LS1.B: Growth and Development of Organisms: Investigation 3 Parts 1-4; Investigation 4 Parts 1-4; Investigation 6 Parts –4; Investigation 7 Parts 1 and 2; Investigation 8 Parts 1 and 2</p> <p>LS3.A: Inheritance of Traits: Investigation 7 Parts 1 and 2</p> <p>LS3.B Variation of Traits: Investigation 7 Parts 1 and 2</p> <p>Science and Engineering Practices Developing and Using Models: Investigation 3 Parts 1-2 and 4; Investigation 4 Parts 1 and 4; Investigation 5 Parts 1 and 2; Investigation 7 Part 2</p> <p>Crosscutting Concepts Cause and Effect: Investigation 1 Part 2; Investigation 2 Part 3; Investigation 5 Parts 1 and 3; Investigation 6 Parts 2 and 4; Investigation 7 Parts 1 and 2; Investigation 8 Part 1; Investigation 9 Parts 1 and 2</p>

ENVIRONMENTAL LITERACY AND SUSTAINABILITY

DIVERSITY OF LIFE

<p>3.4.6-8.E Collect, analyze, and interpret environmental data to describe a local environment.</p>	<p>Disciplinary Core Ideas LS2.A: Interdependent Relationships in Ecosystems: Investigation 4 Extension ESS2.D: Weather and Climate: Investigation 4 Extension</p> <p>Science and Engineering Practices Developing and Using Models: Investigation 4 Extension</p> <p>Crosscutting Concepts Systems and System Models: Investigation 4 Extension</p>
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TECHNOLOGY AND ENGINEERING

DIVERSITY OF LIFE

<p>3.5.6-8.CC Consider historical factors that have contributed to the development of technologies and human progress.</p>	<p>Disciplinary Core Ideas ETS1.B: Developing Possible Solutions: Investigation 2, Part 1 Reading</p> <p>Science and Engineering Practices Asking Questions and Defining Problems: Investigation 2, Part 1 Reading</p> <p>Technology and Engineering Practices Optimism: Investigation 2, Part 1 Reading</p>
<p>3.5.6-8.DD Engage in a research and development process to simulate how inventions and innovations have evolved through systematic tests and refinements.</p>	<p>Disciplinary Core Ideas ETS1.B: Developing Possible Solutions: Investigation 2 Extension</p> <p>Science and Engineering Practices Asking Questions and Defining Problems: Investigation 2 Extension</p> <p>Technology and Engineering Practices Optimism: Investigation 2 Extension</p>

SCIENCE	
HUMAN SYSTEMS AND INTERACTIONS	
<p>3.1.6-8.C Use argument supported by evidence for how the body is a system of interacting systems composed of groups of cells.</p>	<p>Disciplinary Core Ideas LS1.A: Structure and Function: Investigation 1 Parts 1 and 2; Investigation 2 Parts 1 and 2; Investigation 3 Parts 1-4</p> <p>Science and Engineering Practices Engaging in Argument from Evidence: Investigation 1 Parts 1 and 2; Investigation 3 Parts 1 and 2</p> <p>Crosscutting Concepts Systems and Systems Models: Investigation 1 Parts 1 and 2; Investigation 2 Parts 1 and 2; Investigation 3 Parts 1-4</p>
<p>3.1.6-8.G Develop a model to describe how food is rearranged through chemical reactions forming new molecules that support growth and/or release energy as this matter moves through an organism.</p>	<p>Disciplinary Core Ideas LS1.C Organization for Matter and Energy Flow in Organisms: Investigation 2 Parts 1 and 2</p> <p>Science and Engineering Practices Developing and Using Models: Investigation 2 Parts 1 and 2; Investigation 3 Parts 1 and 2</p> <p>Crosscutting Concepts Energy and Matter: Investigation 2 Parts 1 and 2</p>
<p>3.1.6-8.H Gather and synthesize information that sensory receptors respond to stimuli by sending messages to the brain for immediate behavior or storage as memories.</p>	<p>Disciplinary Core Ideas LS1.D Information Processing: Investigation 3 Parts 1-4</p> <p>Science and Engineering Practices Obtaining, Evaluating, and Communicating Information: Investigation 1 Parts 1 and 2; Investigation 2 Parts 1 and 2; Investigation 3 Parts 1-4</p> <p>Crosscutting Concepts Cause and Effect Investigation 1 Part 2; Investigation 3 Parts 1-4</p>

FOSS 6th Grade Assessment Opportunities

Disciplinary Core Ideas Assessment Opportunities – 6th Grade

Course	Inv.	Disciplinary Core Ideas													
		PS1.A	PS3.A	PS3.B	LS1.A	LS1.B	LS1.C	LS1.D	ESS2.C	ESS2.D	ESS3.B	ESS3.C	ETS1.A	ETS1.B	ETS1.C
Weather and Water	1	x							x	x					
	2	x							x	x					
	3	x		x					x	x					
	4		x	x						x					
	5		x	x									x	x	x
	6	x	x	x					x	x					
	7	x	x	x					x						
	8								x	x		x			
	9									x	x	x			
	10	x	x	x					x	x	x	x	x	x	x
Diversity of Life	1				x										
	2				x										
	3				x	x									
	4				x	x									
	5				x										
	6					x									
	7					x									
	8				x	x									
	9				x										
Human Systems Interactions	1														
	2				x		x								
	3				x			x							

Science and Engineering Practices Assessment Opportunities – 6th Grade

Course	Inv.	Science and Engineering Practices						
		Asking Questions and Defining Problems	Developing and Using Models	Planning and Carrying Out Investigations	Analyzing and Interpreting Data	Constructing Explanations and Designing Solutions	Engaging in Argument from Evidence	Obtaining, Evaluating, and Communicating Information
Weather and Water	1	x	x	x	x		x	
	2	x	x	x	x			
	3		x	x	x			
	4	x	x	x	x			
	5	x	x	x	x	x	x	
	6		x		x			
	7	x	x	x	x		x	
	8		x		x			
	9	x	x	x	x	x	x	
	10	x	x		x		x	
Diversity of Life	1			x		x	x	
	2			x			x	
	3		x	x		x	x	
	4		x	x		x	x	
	5		x	x		x		
	6			x			x	
	7		x			x		
	8			x		x	x	
	9			x		x	x	
Human Systems Interactions	1						x	x
	2		x					x
	3		x				x	x

Crosscutting Concepts Assessment Opportunities – 6th Grade

Course	Inv.	Crosscutting Concepts					
		Patterns	Cause and Effect	Scale, Proportion, and Quantity	Systems and System Models	Energy and Matter in Systems	Structure and Function
Weather and Water	1	x	x		x		
	2	x	x				
	3	x	x	x	x	x	
	4		x	x	x	x	
	5	x	x	x	x	x	
	6	x	x	x	x	x	
	7		x	x	x	x	
	8	x	x	x	x	x	
	9	x	x	x	x	x	
	10	x	x		x		
Diversity of Life	1		x	x			x
	2		x	x			x
	3			x	x		x
	4			x	x		x
	5		x		x	x	x
	6		x		x		x
	7		x				
	8		x		x		x
	9		x	x	x		x
Human Systems Interactions	1		x	x	x		
	2			x	x	x	
	3		x	x	x		

FOSS Next Generation Middle School Detail Correlation – 7th Grade

SCIENCE	
EARTH HISTORY	
<p>3.1.6-8.O 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.</p>	<p>Disciplinary Core Ideas LS4.A: Evidence of Common Ancestry and Diversity: Investigation 4 Parts 1-3</p> <p>Science and Engineering Practices Analyzing and Interpreting Data: Investigation 1 Parts 2 and 3; Investigation 2 Parts 1-3; Investigation 3 Parts 1-3; Investigation 4 Parts 1-3; Investigation 5 Parts 1-3; Investigation 6 Parts 1 and 2; Investigation 7 Part 2</p> <p>Crosscutting Concepts Cause and Effect: Investigation 1 Part 3; Investigation 2 Parts 1-3; Investigation 3 Part 2; Investigation 4 Parts 1-3; Investigation 5 Parts 2 and 3; Investigation 6 Parts 1-3; Investigation 7 Parts 1 and 2; Investigation 8 Parts 1-3; Investigation 9 Parts 1 and 2</p>
<p>3.3.6-8.D Construct a scientific explanation based on evidence from rock strata for how the geologic time scale is used to organize Earth’s 4.6-billion-year-old history.</p>	<p>Disciplinary Core Ideas ESS1.C: The History of Planet Earth: Investigation 1 Parts 1-3; Investigation 3 Parts 1-3; Investigation 4 Parts 1-3; Investigation 6 Parts 1-3; Investigation 7 Parts 1 and 2; Investigation 9 Parts 1 and 2</p> <p>Science and Engineering Practices Constructing Explanations and Designing Solutions: Investigation 1 Part 1; Investigation 2 Parts 1-3; Investigation 3 Parts 1-3; Investigation 4 Parts 1 and 3; Investigation 5 Part 1; Investigation 6 Parts 2 and 3; Investigation 7 Parts 1 and 2; Investigation 8 Parts 2 and 3; Investigation 9 Parts 1 and 2</p> <p>Crosscutting Concepts Scale, Proportion, and Quantity: Investigation 1 Parts 2 and 3; Investigation 2 Parts 1-3; Investigation 3 Parts 1-3; Investigation 4 Parts 2 and 3; Investigation 5 Parts 2 and 3; Investigation 6 Parts 1 and 3; Investigation 9 Part 1</p>

SCIENCE
EARTH HISTORY

<p>3.3.6-8.E Construct an explanation based on evidence for how geoscience processes have changed Earth’s surface at varying time and spatial scales.</p>	<p>Disciplinary Core Ideas ESS2.A: Earth's Materials and Systems: Investigation 1 Parts 1-3; Investigation 2 Parts 1-3; Investigation 3 Parts 1-3; Investigation 5 Parts 1-3; Investigation 6 Parts 1-3; Investigation 7 Parts 1 and 2; Investigation 9 Parts 1 and 2 ESS2.C: The Roles of Water in earth’s Surface Processes: Investigation 1 Parts 1-3; Investigation 2 Parts 1-3; Investigation 3 Parts 1-3; Investigation 9 Parts 1 and 2</p> <p>Science and Engineering Practices Constructing Explanations and Designing Solutions: Investigation 1 Part 1; Investigation 2 Parts 1-3; Investigation 3 Parts 1-3; Investigation 4 Parts 1 and 3; Investigation 5 Part 1; Investigation 6 Parts 2 and 3; Investigation 7 Parts 1 and 2; Investigation 8 Parts 2 and 3; Investigation 9 Parts 1 and 2</p> <p>Crosscutting Concepts Scale, Proportion, and Quantity: Investigation 1 Parts 2 and 3; Investigation 2 Parts 1-3; Investigation 3 parts 1-3; Investigation 4 Parts 2 and 3; Investigation 5 Parts 2 and 3; Investigation 6 Parts 1 and 3; Investigation 9 Part 1</p>
<p>3.3.6-8.F Develop a model to describe the cycling of earth’s materials and the flow of energy that drives this process.</p>	<p>Disciplinary Core Ideas ESS2.A: Earth's Materials and Systems: Investigation 1 Parts 1-3; Investigation 2 Parts 1-3; Investigation 3 Parts 1-3; Investigation 5 Parts 1-3; Investigation 6 Parts 1-3; Investigation 7 Parts 1 and 2; Investigation 9 Parts 1 and 2</p> <p>Science and Engineering Practices Developing and Using Models: Investigation 1 Part 3; Investigation 2 Part 2; Investigation 3 Parts 1-3; Investigation 4 Part 2; Investigation 5 Part 2; Investigation 6 Part 3; Investigation 7 Parts 1 and 2; Investigation 9 Part 1</p> <p>Crosscutting Concepts Stability and Change: Investigation 4 Part 3; Investigation 6 Parts 2 and 3; Investigation 7 Parts 1 and 2; Investigation 8 Parts 2 and 3</p>

SCIENCE
EARTH HISTORY

<p>3.3.6-8.G Analyze and interpret data on the distribution of fossils and rocks, continental shapes, and seafloor structures to provide evidence of the past plate motions.</p>	<p>Disciplinary Core Ideas ESS1.C: The History of Planet Earth: Investigation 1 Parts 1-3; Investigation 3 Parts 1-3; Investigation 4 Parts 1-3; Investigation 6 Parts 1-3; Investigation 7 Parts 1 and 2; Investigation 9 Parts 1 and 2 ESS2.B: Plate Tectonics and Large-Scale System Interactions: Investigation 6 Parts 1-3; Investigation 7 Parts 1 and 2</p> <p>Science and Engineering Practices Analyzing and Interpreting Data: Investigation 1 Parts 2 and 3; Investigation 2 Parts 1-3; Investigation 3 Parts 1-3; Investigation 4 Parts 1-3; Investigation 5 Parts 1-3; Investigation 6 Parts 1 and 2; Investigation 7 Part 2</p> <p>Crosscutting Concepts Patterns: Investigation 1 Parts 1-3; Investigation 2 Parts 2 and 3; Investigation 3 Parts 1-3; Investigation 4 Parts 1-3; Investigation 5 Parts 2 and 3; Investigation 6 Parts 1-3; Investigation 7 Part 2; Investigation 8 Part 2; Investigation 9 Part 1</p>
<p>3.3.6-8.K Construct a scientific explanation based on evidence for how the uneven distribution of Earth’s mineral, energy, and groundwater resources are the result of past and current geoscience processes.</p>	<p>Disciplinary Core Ideas ESS3.A: Natural Resources: Investigation 8 Parts 1-3</p> <p>Science and Engineering Practices Constructing Explanations and Designing Solutions: Investigation 1 Part 1; Investigation 2 Parts 1-3; Investigation 3 Parts 1-3; Investigation 4 Parts 1 and 3; Investigation 5 Part 1; Investigation 6 Parts 2 and 3; Investigation 7 Parts 1 and 2; Investigation 8 Parts 2 and 3; Investigation 9 Parts 1 and 2</p> <p>Crosscutting Concepts Cause and Effect: Investigation 1 Part 3; Investigation 2 Parts 1-3; Investigation 3 Part 2; Investigation 4 Parts 1-3; Investigation 5 Parts 2 and 3; Investigation 6 Parts 1-3; Investigation 7 Parts 1 and 2; Investigation 8 Parts 1-3; Investigation 9 Parts 1 and 2</p>
<p>3.3.6-8.L Analyze and interpret data on natural hazards to forecast future catastrophic events and inform the development of technologies to mitigate their effects.</p>	<p>Disciplinary Core Ideas ESS3.B: Natural Hazards: Investigation 6 Parts 1-3; Investigation 8 Parts 1-3</p> <p>Science and Engineering Practices Analyzing and Interpreting Data: Investigation 1 Parts 2 and 3; Investigation 2 Parts 1-3; Investigation 3 Parts 1-3; Investigation 4 Parts 1-3; Investigation 5 Parts 1-3; Investigation 6 Parts 1 and 2; Investigation 7 Part 2</p> <p>Crosscutting Concepts Patterns: Investigation 1 Parts 1-3; Investigation 2 Parts 2 and 3; Investigation 3 Parts 1-3; Investigation 4 Parts 1-3; Investigation 5 Parts 2 and 3; Investigation 6 Parts 1-3; Investigation 7 Part 2; Investigation 8 Part 2; Investigation 9 Part 1</p>

SCIENCE

EARTH HISTORY

<p>3.3.6-8.M Apply scientific principles to design a method for monitoring and minimizing a human impact on the environment.</p>	<p>Disciplinary Core Ideas ESS3.C: Human Impacts on Earth Systems: Investigation 8 Parts 1-3</p> <p>Science and Engineering Practices Constructing Explanations and Designing Solutions: Investigation 1 Part 1; Investigation 2 Parts 1-3; Investigation 3 Parts 1-3; Investigation 4 Parts 1 and 3; Investigation 5 Part 1; Investigation 6 Parts 2 and 3; Investigation 7 Parts 1 and 2; Investigation 8 Parts 2 and 3; Investigation 9 Parts 1 and 2</p> <p>Crosscutting Concepts Cause and Effect: Investigation 1 Part 3; Investigation 2 Parts 1-3; Investigation 3 Part 2; Investigation 4 Parts 1-3; Investigation 5 Parts 2 and 3; Investigation 6 Parts 1-3; Investigation 7 Parts 1 and 2; Investigation 8 Parts 1-3; Investigation 9 Parts 1 and 2</p>
<p>3.3.6-8.N Construct an argument supported by evidence for how increases in human population and per-capita consumption of natural resources impact Earth's systems.</p>	<p>Disciplinary Core Ideas ESS3.C: Human Impacts on Earth Systems: Investigation 8 Parts 1-3</p> <p>Science and Engineering Practices Engaging in Argument from Evidence: Investigation 3 Part 3; Investigation 7 Part 2; Investigation 8 Part 3; Investigation 9 Part 2</p> <p>Crosscutting Concepts Cause and Effect: Investigation 1 Part 3; Investigation 2 Parts 1-3; Investigation 3 Part 2; Investigation 4 Parts 1-3; Investigation 5 Parts 2 and 3; Investigation 6 Parts 1-3; Investigation 7 Parts 1 and 2; Investigation 8 Parts 1-3; Investigation 9 Parts 1 and 2</p>
<p>3.3.6-8.O Ask questions to clarify evidence of the factors that have caused the rise in global temperatures over the past century.</p>	<p>Disciplinary Core Ideas ESS3.D: Global Climate Change: Investigation 8 Parts 1-3</p> <p>Science and Engineering Practices Asking Questions and Defining Problems: Investigation 1 Parts 1 and 2; Investigation 5 Part 1; Investigation 6 Parts 1 and 3; Investigation 8 Parts 1-3</p> <p>Crosscutting Concepts Stability and Change: Investigation 4 Part 3; Investigation 6 Parts 2 and 3; Investigation 7 Parts 1 and 2; Investigation 8 Parts 2 and 3</p>

SCIENCE
CHEMICAL INTERACTIONS

<p>3.2.6-8.A Develop models to describe the atomic composition of simple molecules and extended structures.</p>	<p>Disciplinary Core Ideas PS1.A: Structure and Properties of Matter: Investigation 1 Parts 1 and 2; Investigation 2 Parts 1 and 2; Investigation 3 Parts 1-3; Investigation 4 Part 1; Investigation 7 Parts 1 and 2; Investigation 8 Parts 1-4; Investigation 9 Part 1; Investigation 10 Part 2</p> <p>Science and Engineering Practices Developing and Using Models: Investigation 2 Parts 1 and 2; Investigation 3 Parts 2 and 3; Investigation 4 Parts 1-3; Investigation 5 Parts 1-3; Investigation 6 Part 2; Investigation 7 Parts 1 and 2; Investigation 8 Parts 1, 2 and 4; Investigation 9 Parts 1-3; Investigation 10 Parts 1 and 2</p> <p>Crosscutting Concepts Scale, Proportion, and Quantity: Investigation 2 Part 2; Investigation 3 Parts 1-3; Investigation 4 Part 2; Investigation 5 Part 3; Investigation 7 Part 2; Investigation 9 Parts 2 and 3; Investigation 10 Part 1</p>
<p>3.2.6-8.B 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.</p>	<p>Disciplinary Core Ideas PS1.A: Structure and Properties of Matter: Investigation 1 Parts 1 and 2; Investigation 2 Parts 1 and 2; Investigation 3 Parts 1-3; Investigation 4 Part 1; Investigation 7 Parts 1 and 2; Investigation 8 Parts 1-4; Investigation 9 Part 1; Investigation 10 Part 2</p> <p>Science and Engineering Practices Developing and Using Models: Investigation 2 Parts 1 and 2; Investigation 3 Parts 2 and 3; Investigation 4 Parts 1-3; Investigation 5 Parts 1-3; Investigation 6 Part 2; Investigation 7 Parts 1 and 2; Investigation 8 Parts 1, 2 and 4; Investigation 9 Parts 1-3; Investigation 10 Parts 1 and 2</p> <p>Crosscutting Concepts Cause and Effect: Investigation 1 Parts 1 and 2; Investigation 3 Parts 2 and 3; Investigation 4 Parts 1-3; Investigation 6 Part 1; Investigation 7 Parts 1 and 2; Investigation 8 Parts 1-4; Investigation 9 Parts 1-3; Investigation 10 Part 1</p>

SCIENCE

CHEMICAL INTERACTIONS

<p>3.2.6-8.C Gather and make sense of information to describe that synthetic materials come from natural resources and impact society.</p>	<p>Disciplinary Core Ideas PS1.A: Structure and Properties of Matter: Investigation 1 Parts 1 and 2; Investigation 2 Parts 1 and 2; Investigation 3 Parts 1-3; Investigation 4 Part 1; Investigation 7 Parts 1 and 2; Investigation 8 Parts 1-4; Investigation 9 Part 1; Investigation 10 Part 2 PS1.B: Chemical Reactions: Investigation 1 Part 2; Investigation 3 Parts 1-3; Investigation 9 Parts 1-3; Investigation 10 Parts 1 and 2 Science and Engineering Practices Obtaining, Evaluating, and Communicating Information: Investigation 1 Part 2; Investigation 2 Parts 1 and 2; Investigation 3 Parts 2 and 3; Investigation 4 Parts 2 and 3; Investigation 5 Part 2; Investigation 6 Part 2; Investigation 7 Part 2; Investigation 8 Parts 2 and 4; Investigation 9 Parts 1-3; Investigation 10 Parts 1 and 2 Crosscutting Concepts Structure and Function: Investigation 2 Part 2; Investigation 5 Part 2; Investigation 6 Parts 1 and 2; Investigation 8 Part 3; Investigation 9 Part 1</p>
<p>3.2.6-8.D Analyze and interpret data on the properties of substances before and after the substances interact to determine if a chemical reaction has occurred.</p>	<p>Disciplinary Core Ideas PS1.A: Structure and Properties of Matter: Investigation 1 Parts 1 and 2; Investigation 2 Parts 1 and 2; Investigation 3 Parts 1-3; Investigation 4 Part 1; Investigation 7 Parts 1 and 2; Investigation 8 Parts 1-4; Investigation 9 Part 1; Investigation 10 Part 2 PS1.B: Chemical Reactions: Investigation 1 Part 2; Investigation 3 Parts 1-3; Investigation 9 Parts 1-3; Investigation 10 Parts 1 and 2 Science and Engineering Practices Analyzing and Interpreting Data: Investigation 1 Parts 1 and 2; Investigation 3 Parts 1-3; Investigation 4 Parts 1-3; Investigation 5 Parts 1 and 3; Investigation 6 Parts 1 and 2; Investigation 7 Parts 1 and 2; Investigation 8 Parts 1-3; Investigation 9 Parts 2 and 3; Investigation 10 Part 1 Crosscutting Concepts Patterns: Investigation 1 Part 2; Investigation 2 Parts 1 and 2; Investigation 5 Part 1; Investigation 6 Part 1; Investigation 7 Part 2; Investigation 8 Parts 1 and 2</p>

SCIENCE
CHEMICAL INTERACTIONS

<p>3.2.6-8.E Develop and use a model to describe how the total number of atoms does not change in a chemical reaction and thus mass is conserved.</p>	<p>Disciplinary Core Ideas PS1.B: Chemical Reactions: Investigation 1 Part 2; Investigation 3 Parts 1-3; Investigation 9 Parts 1-3; Investigation 10 Parts 1 and 2</p> <p>Science and Engineering Practices Developing and Using Models: Investigation 2 Parts 1 and 2; Investigation 3 Parts 2 and 3; Investigation 4 Parts 1-3; Investigation 5 Parts 1-3; Investigation 6 Part 2; Investigation 7 Parts 1 and 2; Investigation 8 Parts 1, 2 and 4; Investigation 9 Parts 1-3; Investigation 10 Parts 1 and 2</p> <p>Crosscutting Concepts Energy and Matter: Investigation 3 Parts 2 and 3; Investigation 4 Parts 1-3; Investigation 5 Parts 1-3; Investigation 6 Parts 1 and 2; Investigation 8 Parts 1-4; Investigation 9 Parts 2 and 3</p>
<p>3.2.6-8.F Undertake a design project to construct, test, and module a device that either releases or absorbs thermal energy by chemical processes.</p>	<p>Disciplinary Core Ideas PS1.B: Chemical Reactions: Investigation 1 Part 2; Investigation 3 Parts 1-3; Investigation 9 Parts 1-3; Investigation 10 Parts 1 and 2</p> <p>Science and Engineering Practices Constructing Explanations and Designing Solutions: Investigation 1 Part 2; Investigation 2 Parts 1 and 2; Investigation 3 Parts 2 and 3; Investigation 4 Parts 1-3; Investigation 5 Parts 1-3; Investigation 7 Parts 1 and 2; Investigation 8 Parts 1-4; Investigation 9 Parts 1 and 3; Investigation 10 Parts 1 and 2</p> <p>Crosscutting Concepts Energy and Matter: Investigation 3 Parts 2 and 3; Investigation 4 Parts 1-3; Investigation 5 Parts 1-3; Investigation 6 Parts 1 and 2; Investigation 8 Parts 1-4; Investigation 9 Parts 2 and 3</p>
<p>3.2.6-8.M Apply scientific principles to design, construct, and test a device that either minimizes or maximizes thermal energy transfer.</p>	<p>Disciplinary Core Ideas PS3.A: Definitions of Energy: Investigation 4 Parts 1-3; Investigation 5 Parts 1-3; Investigation 6 Parts 1 and 2; Investigation 7 Part 2; Investigation 10 Part 2</p> <p>PS3.B: Conservation of Energy and Energy Transfer: Investigation 4 Parts 1-3; Investigation 5 Parts 1-3; Investigation 6 Parts 1 and 2; Investigation 8 Part 1; Investigation 10 Parts 1 and 2</p> <p>Science and Engineering Practices Constructing Explanations and Designing Solutions: Investigation 1 Part 2; Investigation 2 Parts 1 and 2; Investigation 3 Parts 2 and 3; Investigation 4 Parts 1-3; Investigation 5 Parts 1-3; Investigation 7 Parts 1 and 2; Investigation 8 Parts 1-4; Investigation 9 Parts 1 and 3; Investigation 10 Parts 1 and 2</p> <p>Crosscutting Concepts Energy and Matter: Investigation 3 Parts 2 and 3; Investigation 4 Parts 1-3; Investigation 5 Parts 1-3; Investigation 6 Parts 1 and 2; Investigation 8 Parts 1-4; Investigation 9 Parts 2 and 3</p>

SCIENCE
CHEMICAL INTERACTIONS

<p>3.2.6-8.N 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.</p>	<p>Disciplinary Core Ideas PS3.A: Definitions of Energy: Investigation 4 Parts 1-3; Investigation 5 Parts 1-3; Investigation 6 Parts 1 and 2; Investigation 7 Part 2; Investigation 10 Part 2</p> <p>PS3.B: Conservation of Energy and Energy Transfer: Investigation 4 Parts 1-3; Investigation 5 Parts 1-3; Investigation 6 Parts 1 and 2; Investigation 8 Part 1; Investigation 10 Parts 1 and 2</p> <p>Science and Engineering Practices Planning and Carrying Out Investigations: Investigation 1 Parts 1 and 2; Investigation 3 Parts 1 and 2; Investigation 4 Parts 1 and 2; Investigation 5 Parts 1 and 3; Investigation 6 Parts 1 and 2; Investigation 7 Parts 1 and 2; Investigation 8 Parts 1-3; Investigation 9 Parts 2 and 3; Investigation 10 Part 1</p> <p>Crosscutting Concepts Scale, Proportion, Quantity: Investigation 2 Part 2; Investigation 3 Parts 1-3; Investigation 4 Part 2; Investigation 5 Part 3; Investigation 7 Part 2; Investigation 9 Parts 2 and 3; Investigation 10 Part 1</p>
<p>3.2.6-8.O Construct, use, and present arguments to support the claim that when the kinetic energy of an object changes, energy is transferred to or from the object.</p>	<p>Disciplinary Core Ideas PS3.B: Conservation of Energy and Energy Transfer: Investigation 4 Parts 1-3; Investigation 5 Parts 1-3; Investigation 6 Parts 1 and 2; Investigation 8 Part 1; Investigation 10 Parts 1 and 2</p> <p>Science and Engineering Practices Engaging in Argument from Evidence: Investigation 1 Part 2; Investigation 3 Parts 2 and 3; Investigation 6 Part 1; Investigation 8 Parts 1 and 3; Investigation 9 Part 3</p> <p>Crosscutting Concepts Energy and Matter: Investigation 3 Parts 2 and 3; Investigation 4 Parts 1-3; Investigation 5 Parts 1-3; Investigation 6 Parts 1 and 2; Investigation 8 Parts 1-4; Investigation 9 Parts 2 and 3</p>

TECHNOLOGY AND ENGINEERING

CHEMICAL INTERACTIONS

<p>3.5.6-8.B Use instruments to gather data on the performance of everyday products.</p>	<p>Disciplinary Core Ideas ETS1.B: Developing Possible Solutions: Investigation 6, Parts 1-2; Investigation 8, Part 3</p> <p>Science and Engineering Practices Using Mathematics and Computational Thinking: Investigation 6, Parts 1 and 2; Investigation 8, Part 3</p> <p>Technology and Engineering Practices Systems Thinking: Investigation 6, Parts 1 and 2; Investigation 8, Part 3</p>
<p>3.5.6-8.H Evaluate trade-offs based on various perspectives as part of a decision process that recognizes the need for careful compromises among competing factors.</p>	<p>Disciplinary Core Ideas ETS1.A: Defining and Delimiting Engineering Problems: Investigation 8, Part 1 and 3</p> <p>Science and Engineering Practices Engaging in Argument from Evidence: Investigation 8, Parts 1 and 3</p> <p>Technology and Engineering Practices Optimism: Investigation 8, Parts 1-3</p>
<p>3.5.6-8.I Examine the ways that technology can have both positive and negative effects at the same time.</p>	<p>Disciplinary Core Ideas NAEP T.8.3: Positive and Negative Impacts: Investigation 7, Part 2 Reading; Investigation 9 Part 1 Reading</p> <p>Science and Engineering Practices Obtaining, Evaluating, and Communicating Information: Investigation 7, Part 2 Reading; Investigation 9 Part 1 Reading</p> <p>Technology and Engineering Practices Attention to Ethics: Investigation 7, Part 2 Reading; Investigation 9 Part 1 Reading</p>
<p>3.5.6-8.L Design methods to gather data about technological systems.</p>	<p>Disciplinary Core Ideas NAEP I.8.13: Tasks with Digital Tools: Investigation 6, Part 2</p> <p>Science and Engineering Practices Using Mathematics and Computational Thinking: Investigation 6, Part 2</p> <p>Technology and Engineering Practices Making and Doing: Investigation 6, Part 2</p>
<p>3.5.6-8.M 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.</p>	<p>Disciplinary Core Ideas ETS1.B: Developing Possible Solutions: Investigation 6, Parts 1-2; Investigation 8, Part 3 3ETS1.C: Optimizing the Design Solution: Investigation 6, Part 2; Investigation 8, Part 3</p> <p>Science and Engineering Practices Developing and Using Models: Investigation 6, Parts 1-2; Investigation 8, Part 3</p> <p>Technology and Engineering Practices Optimism: Investigation 6, Parts 1-2; Investigation 8, Parts 1-2</p>

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TECHNOLOGY AND ENGINEERING
CHEMICAL INTERACTIONS

<p>3.5.6-8.N 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.</p>	<p>Disciplinary Core Ideas ETS1.B: Developing Possible Solutions: Investigation 6, Parts 1-2; Investigation 8, Part 3 ETS1.C: Optimizing the Design Solution: Investigation 6, Part 2; Investigation 8, Part 3</p> <p>Science and Engineering Practices Analyzing and Interpreting Data: Investigation 6, Parts 1-2; Investigation 8, Parts 2-3</p> <p>Technology and Engineering Practices Optimism: Investigation 6, Parts 1-2; Investigation 8, Parts 1-2</p>
<p>3.5.6-8.O Interpret the accuracy of information collected.</p>	<p>Disciplinary Core Ideas ISTE 3B: Evaluate Information: Investigation 6, Part 2 Extension Activity; Investigation 8, Part 3</p> <p>Science and Engineering Practices Analyzing and Interpreting Data: Investigation 6, Part 2 Extension Activity; Investigation 8, Parts 2-3</p> <p>Technology and Engineering Practices Communication: Investigation 6, Part 2 Extension Activity; Investigation 8, Part 3</p>
<p>3.5.6-8.P Evaluate competing design solutions using a systematic process to determine how well they meet the criteria and constraints of the problem.</p>	<p>Disciplinary Core Ideas ETS1.B: Developing Possible Solutions: Investigation 6, Parts 1-2; Investigation 8, Part 3</p> <p>Science and Engineering Practices Engaging in Argument from Evidence: Investigation 6, Parts 1-2; Investigation 8, Parts 2-3</p> <p>Technology and Engineering Practices Critical Thinking: Investigation 6, Parts 1-2; Investigation 8, Parts 2-3</p>
<p>3.5.6-8.Q Apply a technology and engineering design thinking process.</p>	<p>Disciplinary Core Ideas ETS1.B: Developing Possible Solutions: Investigation 6, Parts 1-2; Investigation 8, Part 3</p> <p>Science and Engineering Practices Asking Questions and Defining Problems: Investigation 6, Part 1; Investigation 8, Part 2</p> <p>Technology and Engineering Practices Making and Doing: Investigation 6, Parts 1-2; Investigation 8, Parts 2-3 Creativity: Investigation 6, Parts 1-2; Investigation 8, Parts 2-3</p>
<p>3.5.6-8.R Develop innovative products and systems that solve problems and extend capabilities based on individual or collective needs and wants.</p>	<p>Disciplinary Core Ideas ETS1.B: Developing Possible Solutions: Investigation 6, Parts 1-2; Investigation 8, Part 3</p> <p>Science and Engineering Practices Constructing Explanations and Designing Solutions: Investigation 6, Part 2; Investigation 8, Part 3</p> <p>Technology and Engineering Practices Making and Doing: Investigation 6, Parts 1-2; Investigation 8, Parts 2-3</p>

TECHNOLOGY AND ENGINEERING	
CHEMICAL INTERACTIONS	
<p>3.5.6-8.T Create solutions to problems by identifying and applying human factors in design.</p>	<p>Disciplinary Core Ideas NAEP D.8.10: Design Process Results: Investigation 6, Part 2; Investigation 8, Part 3</p> <p>Science and Engineering Practices Obtaining, Evaluating, and Communicating Information: Investigation 6, Parts 1-2; Investigation 8, Parts 2-3</p> <p>Technology and Engineering Practices Making and Doing: Investigation 6, Parts 1-2; Investigation 8, Parts 2-3</p>
<p>3.5.6-8.U Evaluate and assess the strengths and weaknesses of various design solutions given established principles and elements of design.</p>	<p>Disciplinary Core Ideas ETS1.B: Developing Possible Solutions: Investigation 6, Parts 1-2; Investigation 8, Part 3</p> <p>Science and Engineering Practices Engaging in Argument from Evidence: Investigation 6, Parts 1-2; Investigation 8, Parts 2-3</p> <p>Technology and Engineering Practices Optimism: Investigation 6, Parts 1-2; Investigation 8, Parts 1-2</p>
<p>3.5.6-8.W 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.</p>	<p>Disciplinary Core Ideas ETS1.A: Defining and Delimiting Engineering Problems: Investigation 6, Part 1; Investigation 8, Part 2</p> <p>Science and Engineering Practices Asking Questions and Defining Problems: Investigation 6, Part 1; Investigation 8, Part 2</p> <p>Technology and Engineering Practices Critical Thinking: Investigation 6, Parts 1-2; Investigation 8, Parts 2-3</p>
<p>3.5.6-8.X Defend decisions related to a design problem.</p>	<p>Disciplinary Core Ideas ETS1.B: Developing Possible Solutions: Investigation 6, Parts 1-2; Investigation 8, Part 3</p> <p>Science and Engineering Practices Engaging in Argument from Evidence: Investigation 6, Parts 1-2; Investigation 8, Parts 2-3</p> <p>Technology and Engineering Practices Critical Thinking: Investigation 6, Parts 1-2; Investigation 8, Parts 2-3</p>

TECHNOLOGY AND ENGINEERING
CHEMICAL INTERACTIONS

<p>3.5.6-8.Y Compare, contrast, and identify overlap between the contributions of science, technology, engineering, and mathematics in the development of technological systems.</p>	<p>Disciplinary Core Ideas NAEP D.8.1: Investigating the Natural World: Investigation 9, Part 1 Reading</p> <p>Science and Engineering Practices Obtaining, Evaluating, and Communicating Information: Investigation 9, Part 1 Reading</p> <p>Technology and Engineering Practices Collaboration: Investigation 9, Part 1 Reading</p>
<p>3.5.6-8.Z Analyze how different technological systems often interact with economic, environmental, and social systems.</p>	<p>Disciplinary Core Ideas NAEP T.8.1: Driving Technological Improvements: Investigation 7, Part 2 Reading</p> <p>Science and Engineering Practices Engaging in Argument from Evidence: Investigation 7, Part 2 Reading</p> <p>Technology and Engineering Practices Systems Thinking: Investigation 7, Part 2 Reading Attention to Ethics: Investigation 7, Part 2 Reading</p>
<p>3.5.6-8.AA Adapt and apply an existing product, system, or process to solve a problem in a different setting.</p>	<p>Disciplinary Core Ideas ETS1.C: Optimizing the Design Solution: Investigation 6, Part 2; Investigation 8, Part 3</p> <p>Science and Engineering Practices Constructing Explanations and Designing Solutions: Investigation 6, Part 2; Investigation 8, Part 3</p> <p>Technology and Engineering Practices Making and Doing: Investigation 6, Parts 1-2; Investigation 8, Parts 2-3 Creativity: Investigation 6, Parts 1-2; Investigation 8, Parts 2-3</p>
<p>3.5.6-8.BB Demonstrate how knowledge gained from other content areas affects the development of technological products and systems.</p>	<p>Disciplinary Core Ideas ETS1.C: Optimizing the Design Solution: Investigation 6, Part 2; Investigation 8, Part 3</p> <p>Science and Engineering Practices Obtaining, Evaluating, and Communicating Information: Investigation 6, Parts 1-2; Investigation 8, Parts 2-3</p> <p>Technology and Engineering Practices Making and Doing: Investigation 6, Parts 1-2; Investigation 8, Parts 2-3 Optimism: Investigation 6, Parts 1-2; Investigation 8, Parts 2-3</p>

TECHNOLOGY AND ENGINEERING
CHEMICAL INTERACTIONS

<p>3.5.6-8.CC Consider historical factors that have contributed to the development of technologies and human progress.</p>	<p>Disciplinary Core Ideas ETS1.B: Developing Possible Solutions: Investigation 9, Part 1</p> <p>Science and Engineering Practices Asking Questions and Defining Problems: Investigation 9, Part 1</p> <p>Technology and Engineering Practices Optimism: Investigation 9, Part 1</p>
<p>3.5.6-8.FF Demonstrate how systems thinking involves considering relationships between every part, as well as how the systems interact with the environment in which it is used.</p>	<p>Disciplinary Core Ideas NAEP D.8.11: Systems Processes and Goals:</p> <p>Science and Engineering Practices Developing and Using Models: Investigation 6, Parts 1-2; Investigation 8, Part 3</p> <p>Technology and Engineering Practices Systems Thinking: Investigation 6, Parts 1-2; Investigation 8, Parts 2-3 Attention to Ethics: Investigation 6, Parts 1-2; Investigation 8, Parts 2-3</p>
<p>3.5.6-8.II Predict outcomes of a future product or system at the beginning of the design process.</p>	<p>Disciplinary Core Ideas ETS1.C: Optimizing the Design Solution: Investigation 6, Part 2; Investigation 8, Part 3</p> <p>Science and Engineering Practices Developing and Using Models: Investigation 6, Parts 1-2; Investigation 8, Part 3</p> <p>Technology and Engineering Practices Systems Thinking: Investigation 6, Parts 1-2; Investigation 8, Parts 2-3 Making and Doing: Investigation 6, Parts 1-2; Investigation 8, Parts 2-3</p>

SCIENCE
POPULATIONS AND ECOSYSTEMS

<p>3.1.6-8.F 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.</p>	<p>Disciplinary Core Ideas LS1.C Organization for Matter and Energy Flow in Organisms: Investigation 5 Parts 1-4; Investigation 6 Parts 1-4</p> <p>Science and Engineering Practices Constructing Explanations and Designing Solutions: Investigation 2 Part 1; Investigation 5 Parts 1,2 and 4; Investigation 6 Parts 1-4; Investigation 7 Part 1; Investigation 8 Parts 1-3; Investigation 9 Parts 2 and 3</p> <p>Crosscutting Concepts Energy and Matter: Investigation 3 Parts 1 and 2; Investigation 5 Parts 1, 2 and 4; Investigation 6 Parts 1-4</p>
<p>3.1.6-8.G Develop a model to describe how food is rearranged through chemical reactions forming new molecules that support growth and/or release energy as this matter moves through an organism.</p>	<p>Disciplinary Core Ideas LS1.C Organization for Matter and Energy Flow in Organisms: Investigation 5 Parts 1-4; Investigation 6 Parts 1-4</p> <p>Science and Engineering Practices Developing and Using Models: Investigation 1 Part 2; Investigation 2 Part 1; Investigation 3 Parts 2 and 3; Investigation 4 Parts 2 and 3; Investigation 5 Part 4; Investigation 6 Parts 2 and 4; Investigation 7 Part 1</p> <p>Crosscutting Concepts Energy and Matter: Investigation 3 Parts 1 and 2; Investigation 5 Parts 1, 2 and 4; Investigation 6 Parts 1-4</p>
<p>3.1.6-8.I Analyze and interpret data to provide evidence for the effects of resource availability on organisms and populations of organisms in an ecosystem.</p>	<p>Disciplinary Core Ideas LS2.A: Interdependent Relationships in Ecosystems: Investigation 1 Parts 1-3; Investigation 2 Parts 1-3; Investigation 3 Parts 1-3; Investigation 4 Parts 1-3; Investigation 6 Parts 1-4; Investigation 7 Parts 1-3; Investigation 8 Parts 1-3</p> <p>Science and Engineering Practices Analyzing and Interpreting Data: Investigation 1 Part 3; Investigation 2 Parts 1 and 2; Investigation 3 Parts 1-3; Investigation 4 Parts 2 and 3; Investigation 5 Parts 1-4; Investigation 6 Parts 1 and 2; Investigation 7 Parts 1-3; Investigation 8 Parts 1-3; Investigation 9 Parts 1 and 2</p> <p>Crosscutting Concepts Cause and Effect: Investigation 2 Parts 1-3; Investigation 3 Parts 1-3; Investigation 4 Parts 2 and 3; investigation 5 Part 1; Investigation 6 Part 2; investigation 7 Parts 1-3; Investigation 8 Parts 1-3; Investigation 9 Parts 1-3</p>

SCIENCE
POPULATIONS AND ECOSYSTEMS

<p>3.1.6-8.J Construct an explanation that predicts patterns of interactions among organisms across multiple ecosystems.</p>	<p>Disciplinary Core Ideas LS2.A: Interdependent Relationships in Ecosystems: Investigation 1 Parts 1-3; Investigation 2 Parts 1-3; Investigation 3 Parts 1-3; Investigation 4 Parts 1-3; Investigation 6 Parts 1-4; Investigation 7 Parts 1-3; Investigation 8 Parts 1-3</p> <p>Science and Engineering Practices Constructing Explanations and Designing Solutions: Investigation 2 Part 1; Investigation 5 Parts 1,2 and 4; Investigation 6 Parts 1-4; Investigation 7 Part 1; Investigation 8 Parts 103; Investigation 9 Parts 2 and 3</p> <p>Crosscutting Concepts Patterns: Investigation 1 Parts 1 and 3; Investigation 3 Parts 2 and 3; Investigation 5 Parts 1 and 2; investigation 6 Parts 2 and 3; Investigation 7 Parts 1-3; Investigation 8 Part 1</p>
<p>3.1.6-8.K Develop a model to describe the cycling of matter and flow of energy among living and nonliving parts of an ecosystem.</p>	<p>Disciplinary Core Ideas LS2.B Cycle of Matter and Energy Transfer in Ecosystems: Investigation 3 Parts 1-3; Investigation 5 Parts 1-4; Investigation 6 Parts 1-4</p> <p>Science and Engineering Practices Developing and Using Models: Investigation 1 Part 2; Investigation 2 Part 1; Investigation 3 Parts 2 and 3; Investigation 4 Parts 2 and 3; Investigation 5 Part 4; Investigation 6 Parts 2 and 4; Investigation 7 Part 1</p> <p>Crosscutting Concepts Energy and Matter: Investigation 3 Parts 1 and 2; Investigation 5 Parts 1, 2 and 4; Investigation 6 Parts 1-4</p>
<p>3.1.6-8.L Construct an argument supported by empirical evidence that changes to physical or biological components of an ecosystem affect populations.</p>	<p>Disciplinary Core Ideas LS2.C Ecosystem Dynamics, Functioning, and Resilience: Investigation 4 Parts 1-3; Investigation 6 Parts 1-4; Investigation 7 Parts 1-3; investigation 8 Parts 1-3; Investigation 9 Parts 1-3</p> <p>Science and Engineering Practices Engaging in Argument from Evidence: Investigation 2 Part 1; Investigation 6 Part 1; Investigation 7 Part 2; Investigation 8 Part 2; Investigation 9 Parts 2 and 3</p> <p>Crosscutting Concepts Stability and Change: Investigation 1 Part 3; Investigation 3 Part 1; Investigation 6 Parts 2 and 4; Investigation 7 Parts 1-3; Investigation 8 Parts 1-3; Investigation 9 Parts 2 and 3</p>

SCIENCE

POPULATIONS AND ECOSYSTEMS

<p>3.1.6-8.U Evaluate competing design solutions for maintaining biodiversity and ecosystem services.</p>	<p>Disciplinary Core Ideas LS2.C Ecosystem Dynamics, Functioning, and Resilience: Investigation 4 Parts 1-3; Investigation 6 Parts 1-4; Investigation 7 Parts 1-3; investigation 8 Parts 1-3; Investigation 9 Parts 1-3</p> <p>Science and Engineering Practices Engaging in Argument from Evidence: Investigation 2 Part 1; Investigation 6 Part 1; Investigation 7 Part 2; Investigation 8 Part 2; Investigation 9 Parts 2 and 3</p> <p>Crosscutting Concepts Stability and Change: Investigation 1 Part 3; Investigation 3 Part 1; Investigation 6 Parts 2 and 4; Investigation 7 Parts 1-3; Investigation 8 Parts 1-3; Investigation 9 Parts 2 and 3</p>
<p>3.3.6-8.M Apply scientific principles to design a method for monitoring and minimizing a human impact on the environment.</p>	<p>Disciplinary Core Ideas ESS3.C: Human Impacts on Earth Systems: Investigation 8 Parts 1-3; Investigation 9 Parts 1-3</p> <p>Science and Engineering Practices Constructing Explanations and Designing Solutions: Investigation 2 Part 1; Investigation 5 Parts 1,2 and 4; Investigation 6 Parts 1-4; Investigation 7 Part 1; Investigation 8 Parts 1-3; Investigation 9 Parts 2 and 3</p> <p>Crosscutting Concepts Cause and Effect: Investigation 2 Parts 1-3; Investigation 3 Parts 1-3; Investigation 4 Parts 2 and 3; investigation 5 Part 1; Investigation 6 Part 2; investigation 7 Parts 1-3; Investigation 8 Parts 1-3; Investigation 9 Parts 1-3</p>
<p>3.3.6-8.N Construct an argument supported by evidence for how increases in human population and per-capita consumption of natural resources impact Earth's systems.</p>	<p>Disciplinary Core Ideas ESS3.C: Human Impacts on Earth Systems: Investigation 8 Parts 1-3; Investigation 9 Parts 1-3</p> <p>Science and Engineering Practices Engaging in Argument from Evidence: Investigation 2 Part 1; Investigation 6 Part 1; Investigation 7 Part 2; Investigation 8 Part 2; Investigation 9 Parts 2 and 3</p> <p>Crosscutting Concepts Cause and Effect: Investigation 2 Parts 1-3; Investigation 3 Parts 1-3; Investigation 4 Parts 2 and 3; investigation 5 Part 1; Investigation 6 Part 2; investigation 7 Parts 1-3; Investigation 8 Parts 1-3; Investigation 9 Parts 1-3</p>

ENVIRONMENTAL LITERACY AND SUSTAINABILITY
POPULATIONS AND ECOSYSTEMS

3.4.6-8.A Develop a model to describe how agricultural and food systems function, including the sustainable use of natural resources and the production, processing, and management of food, fiber, and energy.	Disciplinary Core Ideas ESS3.A: Natural Resources: Investigation 6 Extension Activity Science and Engineering Practices Developing and Using Models: Investigation 6 Extension Activity Crosscutting Concepts Systems and System Models: Investigation 6 Extension Activity
3.4.6-8.C Develop a model to describe how watersheds and wetlands function as systems, including the roles and functions they serve.	Disciplinary Core Ideas LS2.A: Interdependent Relationships in Ecosystems: Investigation 4 Extension Activity LS2.C: Ecosystem Dynamics, Functioning, and Resilience: Investigation 4 Extension Activity ESS2.C: The Roles of Water in Earth’s Surface Processes: Investigation 4 Extension Activity Science and Engineering Practices Developing and Using Models: Investigation 4 Extension Activity Crosscutting Concepts Systems and System Models: Investigation 4 Extension Activity Structure and Function: Investigation 4 Extension Activity
3.4.6-8.D Gather, read, and synthesize information from multiple sources to investigate how Pennsylvania environmental issues affect Pennsylvania’s human and natural systems.	Disciplinary Core Ideas ESS3.C: Human Impacts on Earth Systems: Investigation 8 Home/School Connection; Investigation 9, Part 1; Investigation 9 Extension Activity LS2.C: Ecosystem Dynamics, Functioning, and Resilience: Investigation 8 Home/School Connection; Investigation 9, Part 1; Investigation 9 Extension Activity Science and Engineering Practices Obtaining, Evaluating, and Communicating Information: Investigation 8 Home/School Connection; Investigation 9, Part 1; Investigation 9 Extension Activity Crosscutting Concepts Cause and Effect: Investigation 8 Home/School Connection; Investigation 9, Part 1; Investigation 9 Extension Activity Stability and Change: Investigation 8 Home/School Connection; Investigation 9, Part 1; Investigation 9 Extension Activity
3.4.6-8.E Collect, analyze, and interpret environmental data to describe a local environment.	Disciplinary Core Ideas LS2.A: Interdependent Relationships in Ecosystems: Investigation 2 Extension Activity ESS2.D: Weather and Climate: Investigation 2 Extension Activity Science and Engineering Practices Developing and Using Models: Investigation 2 Extension Activity Crosscutting Concepts Systems and System Models: Investigation 2 Extension Activity

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POPULATIONS AND ECOSYSTEMS

<p>3.4.6-8.G Obtain and communicate information to describe how best resource management practices and environmental laws are designed to achieve environmental sustainability.</p>	<p>Disciplinary Core Ideas ESS3.C: Human Impacts on Earth Systems: Investigation 9, Part 1 ETS1.B: Developing Possible Solutions: Investigation 9, Part 1</p> <p>Science and Engineering Practices Obtaining, Evaluating, and Communicating Information: Investigation 9, Part 1</p> <p>Crosscutting Concepts Cause and Effect: Investigation 9, Part 1 Stability and Change: Investigation 9, Part 1</p>
<p>3.4.6-8.H Design a solution to an environmental issue in which individuals and societies can engage as stewards of the environment.</p>	<p>Disciplinary Core Ideas ETS1.B: Developing Possible Solutions: Investigation 8 Extension Activity; Investigation 9, Part 1; Investigation 9 Extension Activity ESS3.C: Human Impacts on Earth Systems: Investigation 8 Extension Activity; Investigation 9, Part 1; Investigation 9 Extension Activity</p> <p>Science and Engineering Practices Constructing Explanations and Designing Solutions: Investigation 8 Extension Activity; Investigation 9, Part 1; Investigation 9 Extension Activity</p> <p>Crosscutting Concepts Science Addresses Questions About the Natural and Material World: Investigation 8 Extension Activity; Investigation 9, Part 1; Investigation 9 Extension Activity</p>
<p>3.4.6-8.I Construct an explanation that describes regional environmental conditions and their implications on environmental justice and social equity.</p>	<p>Disciplinary Core Ideas LS4.D: Biodiversity and Humans: Investigation 9, Part 1</p> <p>Science and Engineering Practices Obtaining, Evaluating, and Communicating Information: Investigation 9, Part 1</p> <p>Crosscutting Concepts Cause and Effect: Investigation 9, Part 1</p>

TECHNOLOGY AND ENGINEERING
POPULATIONS AND ECOSYSTEMS

<p>3.5.6-8.D Analyze how the creation and use of technologies consumes renewable, nonrenewable, and inexhaustible resources; creates waste; and may contribute to environmental challenges.</p>	<p>Disciplinary Core Ideas NAEP T.8.7: Compare and Justify Environmental Effects: Investigation 9, Part 2 NAEP T.8.5: Environmental and Economic Trade-Offs: Investigation 9, Part 2</p> <p>Science and Engineering Practices Engaging in Argument from Evidence: Investigation 9, Part 2</p> <p>Technology and Engineering Practices Attention to Ethics: Investigation 9, Part 2</p>
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TECHNOLOGY AND ENGINEERING	
POPULATIONS AND ECOSYSTEMS	
<p>3.5.6-8.H Evaluate trade-offs based on various perspectives as part of a decision process that recognizes the need for careful compromises among competing factors.</p>	<p>Disciplinary Core Ideas ETS1.A: Defining and Delimiting Engineering Problems: Investigation 9, Part 2</p> <p>Science and Engineering Practices Engaging in Argument from Evidence: Investigation 9, Part 2</p> <p>Technology and Engineering Practices Optimism: Investigation 9, Part 2</p>
<p>3.5.6-8.I Examine the ways that technology can have both positive and negative effects at the same time.</p>	<p>Disciplinary Core Ideas NAEP T.8.3: Positive and Negative Impacts: Investigation 9, Part 2</p> <p>Science and Engineering Practices Obtaining, Evaluating, and Communicating Information: Investigation 9, Part 2</p> <p>Technology and Engineering Practices Attention to Ethics: Investigation 9, Part 2</p>

FOSS 7th Grade Assessment Opportunities

Disciplinary Core Ideas Assessment Opportunities – 7th Grade

Course	Inv	Disciplinary Core Ideas																				
		PS1.A	PS1.B	PS3.A	PS3.B	LS1.C	LS2.A	LS2.B	LS2.C	LS4.A	ESS1.C	ESS2.A	ESS2.B	ESS2.C	ESS3.A	ESS3.B	ESS3.C	ESS3.D	ETS1.A	ETS1.B	ETS1.C	
Chemical Interactions	1	x	x																			
	2	x																				
	3	x	x																			
	4	x		x	x																	
	5			x	x																	
	6			x	x															x	x	x
	7	x		x																		
	8	x			x																x	x
	9	x	x																			
	10	x	x	x	x																x	x
Earth History	1										x	x		x								
	2											x		x								
	3										x	x		x								
	4									x	x											
	5											x										
	6										x	x	x			x						
	7										x	x	x									
	8														x	x	x	x				
	9										x	x		x								
Populations and Ecosystems	1						x															
	2						x															
	3						x	x														
	4						x		x													
	5					x		x														
	6					x	x	x	x													
	7						x		x													
	8						x		x								x					
	9								x								x		x	x		

Science and Engineering Practices Assessment Opportunities – 7th Grade

Course	Inv.	Science and Engineering Practices						
		Asking Questions and Defining Problems	Developing and Using Models	Planning and Carrying Out Investigations	Analyzing and Interpreting Data	Constructing Explanations and Designing Solutions	Engaging in Argument from Evidence	Obtaining, Evaluating, and Communicating Information
Chemical Interactions	1			x	x	x	x	x
	2		x			x		x
	3	x	x	x	x	x	x	x
	4		x	x	x	x		x
	5		x	x	x	x		x
	6		x	x	x		x	x
	7		x	x	x	x		x
	8	x	x	x	x	x	x	x
	9		x	x	x	x	x	x
	10		x	x	x	x		x
Earth History	1	x	x		x	x		
	2		x		x	x		
	3		x		x	x	x	
	4		x		x	x		
	5	x	x		x	x		
	6	x	x		x	x		
	7		x		x	x	x	
	8	x				x	x	
	9		x			x	x	
Populations and Ecosystems	1	x	x	x	x			
	2		x	x	x	x	x	
	3	x	x		x			
	4		x	x	x			
	5		x	x	x	x		
	6	x	x	x	x	x	x	
	7	x	x	x	x	x	x	
	8			x	x	x	x	
	9	x		x	x	x	x	

Crosscutting Concepts Assessment Opportunities – 7th Grade

Course	Inv.	Crosscutting Concepts					
		Patterns	Cause and Effect	Scale, Proportion, and Quantity	Energy and Matter in Systems	Structure and Function	Stability and Change of Systems
Chemical Interactions	1	x	x				
	2	x	x	x		x	
	3		x	x	x		
	4		x	x	x		
	5	x		x	x	x	
	6	x	x		x	x	
	7	x	x	x			
	8	x	x		x	x	
	9		x	x	x	x	
	10			x	x		
Earth History	1	x	x	x			
	2	x	x	x			
	3	x	x	x			
	4	x	x	x			x
	5	x	x	x			
	6	x	x	x			x
	7	x	x				x
	8	x	x				x
	9	x	x	x			
Populations and Ecosystems	1	x		x			x
	2		x	x			
	3	x	x	x	x		x
	4		x				
	5	x	x	x	x		
	6	x	x	x	x		x
	7	x	x	x			x
	8	x	x	x			x
	9		x				x

FOSS Next Generation Middle School Detail Correlation – 8th Grade

SCIENCE	
PLANETARY SCIENCE	
<p>3.3.6-8.A 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 the seasons.</p>	<p>Disciplinary Core Ideas ESS1.A: The Universe and Its Stars: Investigation 1 Part 3; Investigation 2 Parts 1-3; Investigation 3 Parts 1 and 2; Investigation 4 Parts 1-3; Investigation 5 Parts 1 and 2; Investigation 6 Parts 1 and 2; Investigation 9 Part 2</p> <p>Science and Engineering Practices Developing and Using Models: Investigation 1 Part 3; Investigation 2 Parts 1-3; Investigation 3 Part 1; Investigation 4 Parts 1-3; Investigation 5 Part 1; Investigation 6 Parts 1 and 2; Investigation 7 Parts 1, 2 and 4; Investigation 8 Part 1; Investigation 9 Parts 1 and 2</p> <p>Crosscutting Concepts Patterns: Investigation 1 Parts 1 and 3; Investigation 2 Parts 1 and 3; investigation 3 Parts 1 and 2; Investigation 4 Parts 1-3; Investigation 5 Parts 1 and 2; Investigation 7 Parts 1-4; Investigation 8 Parts 1 and 2; Investigation 9 Parts 1 and 2</p>
<p>3.3.6-8.B Develop and use a model to describe the role of gravity in the motions within galaxies and the solar system.</p>	<p>Disciplinary Core Ideas ESS1.A: The Universe and Its Stars: Investigation 1 Part 3; Investigation 2 Parts 1-3; Investigation 3 Parts 1 and 2; Investigation 4 Parts 1-3; Investigation 5 Parts 1 and 2; Investigation 6 Parts 1 and 2; Investigation 9 Part 2</p> <p>ESS1.B: Earth and the Solar System: Investigation 2 Parts 1-3; Investigation 3 Parts 1 and 2; Investigation 5 Parts 1 and 2; investigation 6 Parts 1 and 2; Investigation 7 Parts 1-4; Investigation 9 Part 2</p> <p>Science and Engineering Practices Developing and Using Models: Investigation 1 Part 3; Investigation 2 Parts 1-3; Investigation 3 Part 1; Investigation 4 Parts 1-3; Investigation 5 Part 1; Investigation 6 Parts 1 and 2; Investigation 7 Parts 1, 2 and 4; Investigation 8 Part 1; Investigation 9 Parts 1 and 2</p> <p>Crosscutting Concepts Systems and Systems Models: Investigation 1 Parts 1-3; Investigation 3 Part 2; Investigation 4 Parts 1-3; Investigation 5 Part 1; Investigation 6 Parts 1 and 2; Investigation 7 Parts 1 and 4; Investigation 9 Parts 1-3</p>

SCIENCE
PLANETARY SCIENCE

<p>3.3.6-8.C Analyze and interpret data to determine scale properties of objects in the solar system.</p>	<p>Disciplinary Core Ideas ESS1.B: Earth and the Solar System: Investigation 2 Parts 1-3; Investigation 3 Parts 1 and 2; Investigation 5 Parts 1 and 2; investigation 6 Parts 1 and 2; Investigation 7 Parts 1-4; Investigation 9 Part 2</p> <p>Science and Engineering Practices Analyzing and Interpreting Data: Investigation 1 Part 1; Investigation 2 Parts 1-3; Investigation 4 Part 2; Investigation 5 Parts 1 and 2; Investigation 6 Parts 1 and 2; Investigation 7 Parts 2-4; Investigation 8 Part 1; Investigation 9 Parts 1 and 2</p> <p>Crosscutting Concepts Scale, Proportion, and Quantity: Investigation 1 Parts 1 and 2; Investigation 2 Parts 1-3; Investigations 3 Part 2; Investigation 5 Parts 1 and 2; Investigation 6 Parts 1 and 2; Investigation 7 Parts 1-4; Investigation 8 Parts 1 and 2; Investigation 9 Part 2</p>
<p>3.3.6-8.E Construct an explanation based on evidence for how geoscience processes have changed Earth’s surface at varying time and spatial scales.</p>	<p>Disciplinary Core Ideas ESS2.A: Earth's Materials and Systems: Investigation 5 Parts 1 and 2; Investigation 7 Parts 1-4</p> <p>ESS2.C: The Roles of Water in earth’s Surface Processes: Investigation 7 Parts 1-4</p> <p>Science and Engineering Practices Constructing Explanations and Designing Solutions: Investigation 2 Parts 1-3; Investigation 4 Parts 1-3; Investigation 5 Part 1; Investigation 6 Part 2; Investigation 7 Part 4; Investigation 8 Part 2; Investigation 9 Part 3</p> <p>Crosscutting Concepts Scale, Proportion, and Quantity: Investigation 1 Parts 1 and 2; Investigation 2 Parts 1-3; Investigations 3 Part 2; Investigation 5 Parts 1 and 2; Investigation 6 Parts 1 and 2; Investigation 7 Parts 1-4; Investigation 8 Parts 1 and 2; Investigation 9 Part 2</p>

SCIENCE
PLANETARY SCIENCE

<p>3.3.6-8.M Apply scientific principles to design a method for monitoring and minimizing a human impact on the environment.</p>	<p>Disciplinary Core Ideas ESS3.C: Human Impacts on Earth Systems: Investigation 1 Parts 1 and 2; Investigation 7 Parts 1-4</p> <p>Science and Engineering Practices Constructing Explanations and Designing Solutions: Investigation 2 Parts 1-3; Investigation 4 Parts 1-3; Investigation 5 Part 1; Investigation 6 Part 2; Investigation 7 Part 4; Investigation 8 Part 2; Investigation 9 Part 3</p> <p>Crosscutting Concepts Cause and Effect: Investigation 2 Parts 1-3; Investigation 4 Parts 1 and 3; Investigation 5 Parts 1 and 2; Investigation 6 Part 2; Investigation 7 Part 2 and 4; Investigation 9 Part 2</p>
<p>3.3.6-8.N Construct an argument supported by evidence for how increases in human population and per-capita consumption of natural resources impact Earth's systems.</p>	<p>Disciplinary Core Ideas ESS3.C: Human Impacts on Earth Systems: Investigation 1 Parts 1 and 2; Investigation 7 Parts 1-4</p> <p>Science and Engineering Practices Engaging in Argument from Evidence: Investigation 2 Part 1; Investigation 5 Part 1; Investigation 6 Part 2; Investigation 7 Parts 2-4; Investigation 9 Part 2</p> <p>Crosscutting Concepts Cause and Effect: Investigation 2 Parts 1-3; Investigation 4 Parts 1 and 3; Investigation 5 Parts 1 and 2; Investigation 6 Part 2; Investigation 7 Part 2 and 4; Investigation 9 Part 2</p>

ENVIRONMENTAL LITERACY AND SUSTAINABILITY
PLANETARY SCIENCE

<p>3.4.6-8.B Analyze and interpret data about how different societies (economic and social systems) and cultures use and manage natural resources differently.</p>	<p>Disciplinary Core Ideas ESS3.A: Natural Resources: Investigation 7, Home/School Connections ESS3.C: Human Impacts on Earth Systems: Investigation 7, Home/School Connections</p> <p>Science and Engineering Practices Analyzing and Interpreting Data: Investigation 7, Home/School Connections</p> <p>Crosscutting Concepts Cause and Effect: Investigation 7, Home/School Connections</p>
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TECHNOLOGY AND ENGINEERING
PLANETARY SCIENCE

<p>3.5.6-8.E Consider the impacts of a proposed or existing technology and devise strategies for reducing, reusing, and recycling waste caused by its creation.</p>	<p>Disciplinary Core Ideas NAEP T.8.3: Technological Impacts on Society: Investigation 5, Part 2</p> <p>Science and Engineering Practices Engaging in Argument from Evidence: Investigation 5, Part 2</p> <p>Technology and Engineering Practices Optimism: Investigation 5, Part 2</p>
<p>3.5.6-8.F Analyze examples of technologies that have changed the way people think, interact, live, and communicate.</p>	<p>Disciplinary Core Ideas ESS3-3: Earth and Human Activity: Investigation 8, Part 2</p> <p>Science and Engineering Practices Obtaining, Evaluating, and Communicating Information: Investigation 8, Part 2</p> <p>Technology and Engineering Practices Critical Thinking: Investigation 8, Parts 1 and 2</p>

TECHNOLOGY AND ENGINEERING	
PLANETARY SCIENCE	
<p>3.5.6-8.Y Compare, contrast, and identify overlap between the contributions of science, technology, engineering, and mathematics in the development of technological systems.</p>	<p>Disciplinary Core Ideas NAEP D.8.1: Investigating the Natural World: Investigation 8, Parts 1 and 2</p> <p>Science and Engineering Practices Obtaining, Evaluating, and Communicating Information: Investigation 8, Part 2</p> <p>Technology and Engineering Practices Collaboration: Investigation 8, Part 2</p>
<p>3.5.6-8.Z Analyze how different technological systems often interact with economic, environmental, and social systems.</p>	<p>Disciplinary Core Ideas NAEP T.8.1: Driving Technological Improvements: Investigation 5, Part 2</p> <p>Science and Engineering Practices Engaging in Argument from Evidence: Investigation 5, Part 2</p> <p>Technology and Engineering Practices Systems Thinking: Investigation 5, Part 2 Attention to Ethics: Investigation 5, Part 2</p>
<p>3.5.6-8.BB Demonstrate how knowledge gained from other content areas affects the development of technological products and systems.</p>	<p>Disciplinary Core Ideas ETS1.C: Optimizing the Design Solution: Investigation 8, Part 2</p> <p>Science and Engineering Practices Obtaining, Evaluating, and Communicating Information: Investigation 8, Parts 1 and 2</p> <p>Technology and Engineering Practices Making and Doing: Investigation 8, Part 2 Optimism: Investigation 8, Part 2</p>

SCIENCE

GRAVITY AND KINETIC ENERGY

<p>3.2.6-8.G Apply Newton’s Third Law to design a solution to a problem involving the motion of two colliding objects.</p>	<p>Disciplinary Core Ideas PS2.A: Forces and Motion: Investigation 1, Parts 1-3; Investigation 2, Parts 1 and 2; investigation 3, Parts 1-3; Investigation 4, Parts 1 and 2</p> <p>Science and Engineering Practices Constructing Explanations and Designing Solutions: Investigation 1, Parts 1 and 3; Investigation 2, Part 1; Investigation 3, Parts 2 and 3; Investigation 4, Parts 1 and 2</p> <p>Crosscutting Concepts System and System Models: Investigation 1, Parts 2 and 3; Investigation 2, Parts 1 and 2; Investigation 3, Parts 1 and 3; Investigation 4, Parts 1 and 2</p>
<p>3.2.6-8.H 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.</p>	<p>Disciplinary Core Ideas PS2.A: Forces and Motion: Investigation 1, Parts 1-3; Investigation 2, Parts 1 and 2; Investigation 3, Parts 1-3; Investigation 4, Parts 1 and 2</p> <p>Science and Engineering Practices Planning and Carrying Out Investigations: Investigation 1, Part 3; Investigation 2, Parts 1 and 2; investigation 3, Parts 1 and 3; Investigation 4, Parts 1 and 2</p> <p>Crosscutting Concepts Stability and Change: Investigation 2, Part 2; Investigation 3, Part 3; Investigation 4, Part 2</p>
<p>3.2.6-8.J Construct and present arguments using evidence to support the claim that gravitational interactions are attractive and depend on the masses of interacting objects.</p>	<p>Disciplinary Core Ideas PS2.B: Types of Interactions: Investigation 1, Parts 1-3; Investigation 2, Parts 1 and 2; Investigation 4, Parts 1 and 2</p> <p>Science and Engineering Practices Engaging in Argument from Evidence: Investigation 4, Part 1</p> <p>Crosscutting Concepts System and System Models: Investigation 1, Parts 2 and 3; Investigation 2, Parts 1 and 2; Investigation 3, Parts 1 and 3; Investigation 4, Parts 1 and 2</p>

SCIENCE
GRAVITY AND KINETIC ENERGY

<p>3.2.6-8.L 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.</p>	<p>Disciplinary Core Ideas PS3.A: Definitions of Energy: Investigation 3, Parts 1-3</p> <p>Science and Engineering Practices Analyzing and Interpreting Data: Investigation 1, Parts 1-3; Investigation 2, parts 1 and 2; Investigation 3, Parts 1 and 2; Investigation 4, Part 1</p> <p>Crosscutting Concepts Scale, Proportion, and Quantity: Investigation 1, Parts 1-3; Investigation 2, Parts 1 and 2; Investigation 3, Parts 1-3; Investigation 4, Part 2</p>
<p>3.2.6-8.O Construct, use, and present arguments to support the claim that when the kinetic energy of an object changes, energy is transferred to or from the object.</p>	<p>Disciplinary Core Ideas PS3.B: Conservation of Energy and Energy Transfer: Investigation 3, Parts 1-3; Investigation 4, Parts 1 and 2</p> <p>Science and Engineering Practices Constructing Explanations and Designing Solutions: Investigation 1, Parts 1 and 3; Investigation 2, Part 1; Investigation 3, Parts 2 and 3; Investigation 4, Parts 1 and 2</p> <p>Crosscutting Concepts Energy and Matter: Investigation 3, Parts 1-3; Investigation 4, Parts 1 and 2</p>
<p>3.2.6-8.P 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.</p>	<p>Disciplinary Core Ideas PS3.A: Definitions of Energy: Investigation 3 Parts 1-3</p> <p>Science and Engineering Practices Developing and Using Models: Investigation 1, Part 1; Investigation 2, Part 2; Investigation 3, Parts 1 and 2; Investigation 4, Part 1</p> <p>Crosscutting Concepts System and System Models: Investigation 1, Parts 2 and 3; Investigation 2, Parts 1 and 2; Investigation 3, Parts 1 and 3; Investigation 4, Parts 1 and 2</p>

TECHNOLOGY AND ENGINEERING	
GRAVITY AND KINETIC ENERGY	
<p>3.5.6-8.F Analyze examples of technologies that have changed the way people think, interact, live, and communicate.</p>	<p>Disciplinary Core Ideas ESS3-3: Earth and Human Activity: Investigation 4, Part 1</p> <p>Science and Engineering Practices Obtaining, Evaluating, and Communicating Information: Investigation 1, Parts 1-3; Investigation 2, parts 1 and 2; Investigation 3, Parts 1 and 2; Investigation 4, Part 1</p> <p>Technology and Engineering Practices Critical Thinking: Investigation 1, Parts 2 and 3; Investigation 2, Parts 1 and 2; Investigation 3, Parts 1 and 3; Investigation 4, Parts 1 and 2</p>
<p>3.5.6-8.G Analyze how an invention or innovation was influenced by the context and circumstances in which it is developed</p>	<p>Disciplinary Core Ideas ETS1.A: Defining and Delimiting Engineering Problems: Investigation 4, Part 1</p> <p>Science and Engineering Practices Obtaining, Evaluating, and Communicating Information: Investigation 1, Parts 1-3; Investigation 2, parts 1 and 2; Investigation 3, Parts 1 and 2; Investigation 4, Part 1</p> <p>Technology and Engineering Practices Critical Thinking: Investigation 1, Parts 2 and 3; Investigation 2, Parts 1 and 2; Investigation 3, Parts 1 and 3; Investigation 4, Parts 1 and 2</p>
<p>3.5.6-8.I Examine the ways that technology can have both positive and negative effects at the same time.</p>	<p>Disciplinary Core Ideas NAEP T.8.3: Positive and Negative Impacts: Investigation 4 Extension Activity and Home/School Connection</p> <p>Science and Engineering Practices Obtaining, Evaluating, and Communicating Information: Investigation 1, Parts 1-3; Investigation 2, parts 1 and 2; Investigation 3, Parts 1 and 2; Investigation 4, Part 1</p> <p>Technology and Engineering Practices Attention to Ethics: Investigation 4 Extension Activity and Home/School Connection</p>

TECHNOLOGY AND ENGINEERING	
GRAVITY AND KINETIC ENERGY	
<p>3.5.6-8.M 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.</p>	<p>Disciplinary Core Ideas ETS1.B: Developing Possible Solutions: Investigation 4, Parts 1 and 2 ETS1.C: Optimizing the Design Solution: Investigation 4, Parts 1 and 2</p> <p>Science and Engineering Practices Developing and Using Models: Investigation 1, Part 1; Investigation 2, Part 2; Investigation 3, Parts 1 and 2; Investigation 4, Part 1</p> <p>Technology and Engineering Practices Optimism: Investigation 4, Part 1</p>
<p>3.5.6-8.N 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.</p>	<p>Disciplinary Core Ideas ETS1.B: Developing Possible Solutions: Investigation 4, Part 1 ETS1.C: Optimizing the Design Solution: Investigation 4, Part 1</p> <p>Science and Engineering Practices Analyzing and Interpreting Data: Investigation 1, Parts 1-3; Investigation 2, parts 1 and 2; Investigation 3, Parts 1 and 2; Investigation 4, Part 1</p> <p>Technology and Engineering Practices Optimism: Investigation 4, Part 1</p>
<p>3.5.6-8.P Evaluate competing design solutions using a systematic process to determine how well they meet the criteria and constraints of the problem.</p>	<p>Disciplinary Core Ideas ETS1.B: Developing Possible Solutions: Investigation 4, Part 1</p> <p>Science and Engineering Practices Engaging in Argument from Evidence: Investigation 4, Part 1</p> <p>Technology and Engineering Practices Critical Thinking: Investigation 1, Parts 2 and 3; Investigation 2, Parts 1 and 2; Investigation 3, Parts 1 and 3; Investigation 4, Parts 1 and 2</p>
<p>3.5.6-8.Q Apply a technology and engineering design thinking process.</p>	<p>Disciplinary Core Ideas ETS1.B: Developing Possible Solutions: Investigation 4, Part 1</p> <p>Science and Engineering Practices Asking Questions and Defining Problems: Investigation 1, Part 3; Investigation 2, Parts 1 and 2; Investigation 3, Parts 1 and 3; Investigation 4, Parts 1 and 2</p> <p>Technology and Engineering Practices Making and Doing: Investigation 1 Parts 1 and 3; Investigation 2 Part 1; Investigation 3 Parts 2 and 3; Investigation 4 Part 1 Creativity: Investigation 1, Parts 1 and 3; Investigation 2, Part 1; Investigation 3, Parts 2 and 3; Investigation 4, Part 1</p>

TECHNOLOGY AND ENGINEERING	
GRAVITY AND KINETIC ENERGY	
<p>3.5.6-8.R Develop innovative products and systems that solve problems and extend capabilities based on individual or collective needs and wants.</p>	<p>Disciplinary Core Ideas ETS1.B: Developing Possible Solutions: Investigation 4, Part 1; Investigation 4 Home/School Connections; Investigation 4 Extension Activity</p> <p>Science and Engineering Practices Constructing Explanations and Designing Solutions: Investigation 1, Parts 1 and 3; Investigation 2, Part 1; Investigation 3, Parts 2 and 3; Investigation 4, Part 1</p> <p>Technology and Engineering Practices Making and Doing: Investigation 1, Parts 1 and 3; Investigation 2, Part 1; Investigation 3, Parts 2 and 3; Investigation 4, Part 1</p>
<p>3.5.6-8.T Create solutions to problems by identifying and applying human factors in design.</p>	<p>Disciplinary Core Ideas NAEP D.8.10: Design Process Results: Investigation 4, Part 1</p> <p>Science and Engineering Practices Obtaining, Evaluating, and Communicating Information: Investigation 1, Parts 1-3; Investigation 2, parts 1 and 2; Investigation 3, Parts 1 and 2; Investigation 4, Part 1</p> <p>Technology and Engineering Practices Making and Doing: Investigation 1, Parts 1 and 3; Investigation 2, Part 1; Investigation 3, Parts 2 and 3; Investigation 4, Part 1</p>
<p>3.5.6-8.U Evaluate and assess the strengths and weaknesses of various design solutions given established principles and elements of design.</p>	<p>Disciplinary Core Ideas ETS1.B: Developing Possible Solutions: Investigation 4, Part 1</p> <p>Science and Engineering Practices Engaging in Argument from Evidence: Investigation 4, Part 1</p> <p>Technology and Engineering Practices Optimism: Investigation 4, Part 1</p>
<p>3.5.6-8.V Refine design solutions to address criteria and constraints.</p>	<p>Disciplinary Core Ideas ETS1.A: Defining and Delimiting Engineering Problems: Investigation 4, Part 1</p> <p>Science and Engineering Practices Asking Questions and Defining Problems: Investigation 1, Part 3; Investigation 2, Parts 1 and 2; investigation 3, Parts 1 and 3; Investigation 4, Parts 1 and 2</p> <p>Technology and Engineering Practices Making and Doing: Investigation 1, Parts 1 and 3; Investigation 2, Part 1; Investigation 3, Parts 2 and 3; Investigation 4, Part 1 Optimism: Investigation 4, Part 1</p>

TECHNOLOGY AND ENGINEERING	
GRAVITY AND KINETIC ENERGY	
<p>3.5.6-8.W 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.</p>	<p>Disciplinary Core Ideas ETS1.A: Defining and Delimiting Engineering Problems: Investigation 4, Part 1</p> <p>Science and Engineering Practices Asking Questions and Defining Problems: Investigation 1, Part 3; Investigation 2, Parts 1 and 2; Investigation 3, Parts 1 and 3; Investigation 4, Parts 1 and 2</p> <p>Technology and Engineering Practices Critical Thinking: Investigation 1, Parts 2 and 3; Investigation 2, Parts 1 and 2; Investigation 3, Parts 1 and 3; Investigation 4, Parts 1 and 2</p>
<p>3.5.6-8.X Defend decisions related to a design problem.</p>	<p>Disciplinary Core Ideas ETS1.B: Developing Possible Solutions: Investigation 4, Part 1</p> <p>Science and Engineering Practices Engaging in Argument from Evidence: Investigation 4 Part 1</p> <p>Technology and Engineering Practices Critical Thinking: Investigation 1, Parts 2 and 3; Investigation 2, Parts 1 and 2; Investigation 3, Parts 1 and 3; Investigation 4, Parts 1 and 2</p>
<p>3.5.6-8.Y Compare, contrast, and identify overlap between the contributions of science, technology, engineering, and mathematics in the development of technological systems.</p>	<p>Disciplinary Core Ideas NAEP D.8.1: Investigating the Natural World: Investigation 4 Home/School Connections; Investigation 4 Extension Activity</p> <p>Science and Engineering Practices Obtaining, Evaluating, and Communicating Information: Investigation 1, Parts 1-3; Investigation 2, parts 1 and 2; Investigation 3, Parts 1 and 2; Investigation 4, Part 1</p> <p>Technology and Engineering Practices Collaboration: Investigation 1, Parts 1 and 3; Investigation 2, Part 1; Investigation 3, Parts 2 and 3; Investigation 4, Part 1</p>
<p>3.5.6-8.AA Adapt and apply an existing product, system, or process to solve a problem in a different setting.</p>	<p>Disciplinary Core Ideas ETS1.C: Optimizing the Design Solution: Investigation 4, Part 1</p> <p>Science and Engineering Practices Constructing Explanations and Designing Solutions: Investigation 1, Parts 1 and 3; Investigation 2, Part 1; Investigation 3, Parts 2 and 3; Investigation 4, Part 1</p> <p>Technology and Engineering Practices Making and Doing: Investigation 1, Parts 1 and 3; Investigation 2, Part 1; Investigation 3, Parts 2 and 3; Investigation 4 Part 1 Creativity: Investigation 1, Parts 1 and 3; Investigation 2, Part 1; Investigation 3, Parts 2 and 3; Investigation 4, Part 1</p>

TECHNOLOGY AND ENGINEERING	
GRAVITY AND KINETIC ENERGY	
<p>3.5.6-8.BB Demonstrate how knowledge gained from other content areas affects the development of technological products and systems.</p>	<p>Disciplinary Core Ideas ETS1.C: Optimizing the Design Solution: Investigation 4, Part 1</p> <p>Science and Engineering Practices Obtaining, Evaluating, and Communicating Information: Investigation 1, Parts 1-3; Investigation 2, parts 1 and 2; Investigation 3 Parts, 1 and 2; Investigation 4, Part 1</p> <p>Technology and Engineering Practices Making and Doing: Investigation 1, Parts 1 and 3; Investigation 2, Part 1; Investigation 3, Parts 2 and 3; Investigation 4, Part 1 Optimism: Investigation 4, Part 1</p>
<p>3.5.6-8.CC Consider historical factors that have contributed to the development of technologies and human progress.</p>	<p>Disciplinary Core Ideas ETS1.B: Developing Possible Solutions: Investigation 4, Part 1</p> <p>Science and Engineering Practices Asking Questions and Defining Problems: Investigation 1, Part 3; Investigation 2, Parts 1 and 2; Investigation 3, Parts 1 and 3; Investigation 4, Parts 1 and 2</p> <p>Technology and Engineering Practices Optimism: Investigation 4, Part 1</p>
<p>3.5.6-8.DD Engage in a research and development process to simulate how inventions and innovations have evolved through systematic tests and refinements.</p>	<p>Disciplinary Core Ideas ETS1.B: Developing Possible Solutions: Investigation 4, Part 1</p> <p>Science and Engineering Practices Asking Questions and Defining Problems: Investigation 1 Part 3; Investigation 2 Parts 1 and 2; investigation 3 Parts 1 and 3; Investigation 4 Parts 1 and 2</p> <p>Technology and Engineering Practices Optimism: Investigation 1, Part 3; Investigation 2, Parts 1 and 2; investigation 3, Parts 1 and 3; Investigation 4, Parts 1 and 2</p>
<p>3.5.6-8.FF Demonstrate how systems thinking involves considering relationships between every part, as well as how the systems interact with the environment in which it is used.</p>	<p>Disciplinary Core Ideas NAEP D.8.11: Systems Processes and Goals: Investigation 4, Extension Activity and Home/School Connection</p> <p>Science and Engineering Practices Developing and Using Models: Investigation 1, Part 1; Investigation 2, Part 2; Investigation 3, Parts 1 and 2; Investigation 4, Part 1</p> <p>Technology and Engineering Practices Systems Thinking: Investigation 1, Parts 2 and 3; Investigation 2, Parts 1 and 2; Investigation 3, Parts 1 and 3; Investigation 4 Parts 1 and 2 Attention to Ethics: Investigation 4 Extension Activity and Home/School Connection</p>

TECHNOLOGY AND ENGINEERING	
GRAVITY AND KINETIC ENERGY	
<p>3.5.6-8.GG Create an open-loop system that has no feedback path and requires human intervention.</p>	<p>Disciplinary Core Ideas ETS1.B: Developing Possible Solutions: Investigation 4, Part 1</p> <p>Science and Engineering Practices Developing and Using Models: Investigation 1, Part 1; Investigation 2, Part 2; Investigation 3, Parts 1 and 2; Investigation 4, Part 1</p> <p>Technology and Engineering Practices Systems Thinking: Investigation 1, Parts 2 and 3; Investigation 2, Parts 1 and 2; Investigation 3, Parts 1 and 3; Investigation 4, Parts 1 and 2 Making and Doing: Investigation 1, Parts 1 and 3; Investigation 2, Part 1; Investigation 3, Parts 2 and 3; Investigation 4, Part 1</p>
<p>3.5.6-8.II Predict outcomes of a future product or system at the beginning of the design process.</p>	<p>Disciplinary Core Ideas ETS1.C: Optimizing the Design Solution: Investigation 4, Part 1</p> <p>Science and Engineering Practices Developing and Using Models: Investigation 1, Part 1; Investigation 2, Part 2; Investigation 3, Parts 1 and 2; Investigation 4, Part 1</p> <p>Technology and Engineering Practices Systems Thinking: Investigation 1, Parts 2 and 3; Investigation 2, Parts 1 and 2; Investigation 3, Parts 1 and 3; Investigation 4, Parts 1 and 2 Making and Doing: Investigation 1, Parts 1 and 3; Investigation 2, Part 1; Investigation 3, Parts 2 and 3; Investigation 4, Part 1</p>
<p>3.5.6-8.KK Explain how technology and engineering are closely linked to creativity, which can result in both intended and unintended innovations.</p>	<p>Disciplinary Core Ideas NAEP D.8.2: Technological Innovation and Adaptation: Investigation 4, Part 1; Investigation 4 Home/School Connection; Investigation 4 Extension Activity</p> <p>Science and Engineering Practices Obtaining, Evaluating, and Communicating Information: Investigation 1, Parts 1-3; Investigation 2, Parts 1 and 2; Investigation 3, Parts 1 and 2; Investigation 4, Part 1</p> <p>Technology and Engineering Practices Creativity: Investigation 1 Parts 1 and 3; Investigation 2 Part 1; Investigation 3 Parts 2 and 3; Investigation 4 Part 1 Making and Doing: Investigation 1, Parts 1 and 3; Investigation 2, Part 1; Investigation 3, Parts 2 and 3; Investigation 4, Part 1</p>

SCIENCE
WAVES

<p>3.2.6-8.Q 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.</p>	<p>Disciplinary Core Ideas PS4.A: Wave Properties: Investigation 1, Parts 1 and 2; Investigation 2, Parts 1-3; Investigation 3, Parts 1-4</p> <p>Science and Engineering Practices Using Mathematics and Computational Thinking: Investigation 1, Parts 1 and 2; Investigation 2, Parts 2 and 3; Investigation 4, Parts 2 and 3</p> <p>Crosscutting Concepts Patterns: Investigation 1, Parts 1 and 2; Investigation 2, Parts 1 and 3; Investigation 3, Parts 2-4; Investigation 4, Parts 1-3</p>
<p>3.2.6-8.R Develop and use a model to describe that waves are reflected, absorbed, or transmitted through various materials.</p>	<p>Disciplinary Core Ideas PS4.A: Wave Properties: Investigation 1, Parts 1 and 2; Investigation 2, Parts 1-3; Investigation 3, Parts 1-4 PS4.B: Electromagnetic Radiation: Investigation 3, Parts 1-4</p> <p>Science and Engineering Practices Developing and Using Models: Investigation 1, Part 2; Investigation 2, Parts 1 and 3; Investigation 3, Parts 2 and 3; Investigation 4, Part 1</p> <p>Crosscutting Concepts Structure and Function: Investigation 2, Part 3; Investigation 4, Part 3</p>
<p>3.2.6-8.S Integrate qualitative scientific and technical information to support the claim that digitalized signals are a more reliable way to encode and transmit information than analog signals.</p>	<p>Disciplinary Core Ideas PS4.C: Information Technologies and Instrumentation: Investigation 4, Parts 1-3</p> <p>Science and Engineering Practices Obtaining, Evaluating, and Communicating Information: Investigation 2, Parts 1-3; Investigation 3, Parts 1, 2 and 4; Investigation 4, Part 3</p> <p>Crosscutting Concepts Structure and Function: Investigation 2, Part 3; Investigation 4, Part 3</p>

TECHNOLOGY AND ENGINEERING	
WAVES	
<p>3.5.6-8.B Use instruments to gather data on the performance of everyday products.</p>	<p>Disciplinary Core Ideas ETS1.B: Developing Possible Solutions: Investigation 2, Parts 1-3</p> <p>Science and Engineering Practices Using Mathematics and Computational Thinking: Investigation 1, Parts 1 and 2; Investigation 2, Parts 2 and 3; Investigation 4, Parts 2 and 3</p> <p>Technology and Engineering Practices Systems Thinking: Investigation 2 Parts 1-3</p>
<p>3.5.6-8.F Analyze examples of technologies that have changed the way people think, interact, live, and communicate.</p>	<p>Disciplinary Core Ideas ESS3-3: Earth and Human Activity: Investigation 4, Part 3; Investigation 2, Parts 1-3</p> <p>Science and Engineering Practices Obtaining, Evaluating, and Communicating Information: Investigation 2, Parts 1-3; Investigation 3, Parts 1, 2 and 4; Investigation 4, Part 3</p> <p>Technology and Engineering Practices Critical Thinking: Investigation 4, Part 3; Investigation 2, Parts 1-3</p>
<p>3.5.6-8.G Analyze how an invention or innovation was influenced by the context and circumstances in which it is developed</p>	<p>Disciplinary Core Ideas ETS1.A: Defining and Delimiting Engineering Problems: Investigation 2, Parts 1-3</p> <p>Science and Engineering Practices Obtaining, Evaluating, and Communicating Information: Investigation 2, Parts 1-3; Investigation 3, Parts 1, 2 and 4; Investigation 4, Part 3</p> <p>Technology and Engineering Practices Critical Thinking: Investigation 2, Parts 1-3</p>
<p>3.5.6-8.H Evaluate trade-offs based on various perspectives as part of a decision process that recognizes the need for careful compromises among competing factors.</p>	<p>Disciplinary Core Ideas ETS1.A: Defining and Delimiting Engineering Problems: Investigation 2, Reading</p> <p>Science and Engineering Practices Engaging in Argument from Evidence: Investigation 2, Reading</p> <p>Technology and Engineering Practices Optimism: Investigation 2, Reading</p>

TECHNOLOGY AND ENGINEERING
WAVES

<p>3.5.6-8.L Design methods to gather data about technological systems.</p>	<p>Disciplinary Core Ideas NAEP I.8.13: Tasks with Digital Tools: Investigation 2, Part 3</p> <p>Science and Engineering Practices Using Mathematics and Computational Thinking: Investigation 1, Parts 1 and 2; Investigation 2, Parts 2 and 3; Investigation 4, Parts 2 and 3</p> <p>Technology and Engineering Practices Making and Doing: Investigation 2, Part 3</p>
<p>3.5.6-8.M 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.</p>	<p>Disciplinary Core Ideas ETS1.B: Developing Possible Solutions: Investigation 2, Parts 1-3 ETS1.C: Optimizing the Design Solution: Investigation 2, Parts 1-3</p> <p>Science and Engineering Practices Developing and Using Models: Investigation 1, Part 2; Investigation 2, Parts 1 and 3; Investigation 3, Parts 2 and 3; Investigation 4, Part 1</p> <p>Technology and Engineering Practices Optimism: Investigation 2, Parts 1-3</p>
<p>3.5.6-8.N 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.</p>	<p>Disciplinary Core Ideas ETS1.B: Developing Possible Solutions: Investigation 2, Parts 1-3 ETS1.C: Optimizing the Design Solution: Investigation 2, Parts 1-3</p> <p>Science and Engineering Practices Analyzing and Interpreting Data: Investigation 2, Parts 1-3</p> <p>Technology and Engineering Practices Optimism: Investigation 2, Parts 1-3</p>
<p>3.5.6-8.O Interpret the accuracy of information collected.</p>	<p>Disciplinary Core Ideas ISTE 3B: Evaluate Information: Investigation 2, Parts 1-3</p> <p>Science and Engineering Practices Analyzing and Interpreting Data: Investigation 2, Parts 1-3</p> <p>Technology and Engineering Practices Communication: Investigation 2, Parts 1-3</p>

TECHNOLOGY AND ENGINEERING	
WAVES	
3.5.6-8.P Evaluate competing design solutions using a systematic process to determine how well they meet the criteria and constraints of the problem.	Disciplinary Core Ideas ETS1.B: Developing Possible Solutions: Investigation 2, Parts 1-3 Science and Engineering Practices Engaging in Argument from Evidence: Investigation 2, Parts 1-3 Technology and Engineering Practices Critical Thinking: Investigation 2, Parts 1-3
3.5.6-8.Q Apply a technology and engineering design thinking process.	Disciplinary Core Ideas ETS1.B: Developing Possible Solutions: Investigation 2, Parts 1-3 Science and Engineering Practices Asking Questions and Defining Problems: Investigation 2, Parts 1-3 Technology and Engineering Practices Making and Doing: Investigation 2, Parts 1-3 Creativity: Investigation 2, Parts 1-3
3.5.6-8.R Develop innovative products and systems that solve problems and extend capabilities based on individual or collective needs and wants.	Disciplinary Core Ideas ETS1.B: Developing Possible Solutions: Investigation 2, Parts 1-3 Science and Engineering Practices Constructing Explanations and Designing Solutions: Investigation 2, Parts 1-3 Technology and Engineering Practices Making and Doing: Investigation 2 Parts 1-3
3.5.6-8.U Evaluate and assess the strengths and weaknesses of various design solutions given established principles and elements of design.	Disciplinary Core Ideas ETS1.B: Developing Possible Solutions: Investigation 2, Parts 1-3 Science and Engineering Practices Engaging in Argument from Evidence: Investigation 2, Parts 1-3 Technology and Engineering Practices Optimism: Investigation 2, Parts 1-3

TECHNOLOGY AND ENGINEERING	
WAVES	
<p>3.5.6-8.V Refine design solutions to address criteria and constraints.</p>	<p>Disciplinary Core Ideas ETS1.A: Defining and Delimiting Engineering Problems: Investigation 2, Parts 1-3</p> <p>Science and Engineering Practices Asking Questions and Defining Problems: Investigation 2, Parts 1-3</p> <p>Technology and Engineering Practices Making and Doing: Investigation 2, Parts 1-3 Optimism: Investigation 2, Parts 1-3</p>
<p>3.5.6-8.W 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.</p>	<p>Disciplinary Core Ideas ETS1.A: Defining and Delimiting Engineering Problems: Investigation 2, Parts 1-3</p> <p>Science and Engineering Practices Asking Questions and Defining Problems: Investigation 2, Parts 1-3</p> <p>Technology and Engineering Practices Critical Thinking: Investigation 2, Parts 1-3</p>
<p>3.5.6-8.X Defend decisions related to a design problem.</p>	<p>Disciplinary Core Ideas ETS1.B: Developing Possible Solutions: Investigation 2, Parts 1-3</p> <p>Science and Engineering Practices Engaging in Argument from Evidence: Investigation 2, Parts 2-3</p> <p>Technology and Engineering Practices Critical Thinking: Investigation 2, Parts 1-3</p>
<p>3.5.6-8.Y Compare, contrast, and identify overlap between the contributions of science, technology, engineering, and mathematics in the development of technological systems.</p>	<p>Disciplinary Core Ideas NAEP D.8.1: Investigating the Natural World: Investigation 2 Home/School Connections, Investigation 2 Extension Activity</p> <p>Science and Engineering Practices Obtaining, Evaluating, and Communicating Information: Investigation 2, Parts 1-3; Investigation 3, Parts 1, 2 and 4; Investigation 4, Part 3</p> <p>Technology and Engineering Practices Collaboration: Investigation 2, Parts 1-3</p>

TECHNOLOGY AND ENGINEERING	
WAVES	
<p>3.5.6-8.Z Analyze how different technological systems often interact with economic, environmental, and social systems.</p>	<p>Disciplinary Core Ideas NAEP T.8.1: Driving Technological Improvements: Investigation 2, Part 3 Reading</p> <p>Science and Engineering Practices Engaging in Argument from Evidence: Investigation 2, Part 3 Reading</p> <p>Technology and Engineering Practices Systems Thinking: Investigation 2 Parts 1-3 Attention to Ethics: Investigation 2, Part 3 Reading</p>
<p>3.5.6-8.AA Adapt and apply an existing product, system, or process to solve a problem in a different setting.</p>	<p>Disciplinary Core Ideas ETS1.C: Optimizing the Design Solution: Investigation 2 Parts 1-3</p> <p>Science and Engineering Practices Constructing Explanations and Designing Solutions: Investigation 2 Parts 1-3</p> <p>Technology and Engineering Practices Making and Doing: Investigation 2 Parts 1-3 Creativity: Investigation 2 Parts 1-3</p>
<p>3.5.6-8.BB Demonstrate how knowledge gained from other content areas affects the development of technological products and systems.</p>	<p>Disciplinary Core Ideas ETS1.C: Optimizing the Design Solution: Investigation 2 Parts 1-3</p> <p>Science and Engineering Practices Obtaining, Evaluating, and Communicating Information: Investigation 2 Parts 1-3; Investigation 3 Parts 1, 2 and 4; Investigation 4 Part 3</p> <p>Technology and Engineering Practices Making and Doing: Investigation 2 Parts 1-3 Optimism: Investigation 2 Parts 1-3</p>
<p>3.5.6-8.CC Consider historical factors that have contributed to the development of technologies and human progress.</p>	<p>Disciplinary Core Ideas ETS1.B: Developing Possible Solutions: Investigation 2 Parts 1-3</p> <p>Science and Engineering Practices Asking Questions and Defining Problems: Investigation 2 Parts 1-3</p> <p>Technology and Engineering Practices Optimism: Investigation 2 Parts 1-3</p>

TECHNOLOGY AND ENGINEERING	
WAVES	
<p>3.5.6-8.FF Demonstrate how systems thinking involves considering relationships between every part, as well as how the systems interact with the environment in which it is used.</p>	<p>Disciplinary Core Ideas NAEP D.8.11: Systems Processes and Goals: Investigation 2, Part 3 Reading</p> <p>Science and Engineering Practices Developing and Using Models: Investigation 1 Part 2; Investigation 2 Parts 1 and 3; Investigation 3 Parts 2 and 3; Investigation 4 Part 1</p> <p>Technology and Engineering Practices Systems Thinking: Investigation 2 Parts 1-3 Attention to Ethics: Investigation 2, Part 3 Reading</p>
<p>3.5.6-8.II Predict outcomes of a future product or system at the beginning of the design process.</p>	<p>Disciplinary Core Ideas ETS1.C: Optimizing the Design Solution: Investigation 2 Parts 1-3</p> <p>Science and Engineering Practices Developing and Using Models: Investigation 1 Part 2; Investigation 2 Parts 1 and 3; Investigation 3 Parts 2 and 3; Investigation 4 Part 1</p> <p>Technology and Engineering Practices Systems Thinking: Investigation 2 Parts 1-3 Making and Doing: Investigation 2 Parts 1-3</p>
<p>3.5.6-8.JJ Apply informed problem-solving strategies to the improvement of existing devices or processes or the development of new approaches.</p>	<p>Disciplinary Core Ideas ETS1.C: Optimizing the Design Solution: Investigation 2 Parts 1-3</p> <p>Science and Engineering Practices Asking Questions and Defining Problems: Investigation 2 Parts 1-3</p> <p>Technology and Engineering Practices Making and Doing: Investigation 2 Parts 1-3 Optimism: Investigation 2 Parts 1-3</p>
<p>3.5.6-8.LL Compare how different technologies involve different sets of processes.</p>	<p>Disciplinary Core Ideas ETS1.B: Developing Possible Solutions: Investigation 2 Parts 1-3</p> <p>Science and Engineering Practices Obtaining, Evaluating, and Communicating Information: Investigation 2 Parts 1-3; Investigation 3 Parts 1, 2 and 4; Investigation 4 Part 3</p> <p>Technology and Engineering Practices Systems Thinking: Investigation 2 Parts 1-3</p>

SCIENCE
ELECTROMAGNETIC FORCE

<p>3.2.6-8.H 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.</p>	<p>Disciplinary Core Ideas PS2.A: Forces and Motion: Investigation 1, Parts 1-3; Investigation 2, Parts 1-3; Investigation 4, Parts 1-3</p> <p>Science and Engineering Practices Planning and Carrying Out Investigations: Investigation 1, Parts 1 and 2; Investigation 2, Parts 1-3; Investigation 3, Parts 1 and 3; Investigation 4, Parts 1 and 2</p> <p>Crosscutting Concepts Stability and Change: Investigation 1, Part 3; Investigation 4, Parts 2 and 3</p>
<p>3.2.6-8.I Ask questions about data to determine the factors that affect the strength of electric and magnetic forces.</p>	<p>Disciplinary Core Ideas PS2.B: Types of Interactions: Investigation 1, Parts 1-3; Investigation 2, Parts 1-3; Investigation 3, Parts 1-3; Investigation 4, Parts 1-3</p> <p>Science and Engineering Practices Asking Questions and Defining Problems: Investigation 1, Part 2; Investigation 2, Part 2; Investigation 3, Parts 2 and 3; Investigation 4, Part 1</p> <p>Crosscutting Concepts Cause and Effect: Investigation 1, Parts 1-3; Investigation 2, Parts 1-3; Investigation 3, Parts 1 and 3; Investigation 4, Parts 1-3</p>
<p>3.2.6-8.K 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.</p>	<p>Disciplinary Core Ideas PS2.B: Types of Interactions: Investigation 1, Parts 1-3; Investigation 2, Parts 1-3; Investigation 3, Parts 1-3; Investigation 4, Parts 1-3</p> <p>Science and Engineering Practices Planning and Carrying Out Investigations: Investigation 1, Parts 1 and 2; Investigation 2, Parts 1-3; Investigation 3, Parts 1 and 3; Investigation 4, Parts 1 and 2</p> <p>Crosscutting Concepts Cause and Effect: Investigation 1, Parts 1-3; Investigation 2, Parts 1-3; Investigation 3, Parts 1 and 3; Investigation 4, Parts 1-3</p>

SCIENCE
ELECTROMAGNETIC FORCE

<p>3.2.6-8.O Construct, use, and present arguments to support the claim that when the kinetic energy of an object changes, energy is transferred to or from the object.</p>	<p>Disciplinary Core Ideas PS3.B: Conservation of Energy and Energy Transfer: Investigation 4, Parts 1-3</p> <p>Science and Engineering Practices Constructing Explanations and Designing Solutions: Investigation 1, Parts 1 and 3; Investigation 2, Parts 1 and 3; Investigation 3, Parts 1-3; Investigation 4, Parts 1-3</p> <p>Crosscutting Concepts Energy and Matter: Investigation 1, Parts 1 and 3; Investigation 2, Parts 1 and 3; Investigation 3, Parts 1 and 3; Investigation 4, Parts 1-3</p>
<p>3.2.6-8.P 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.</p>	<p>Disciplinary Core Ideas PS3.A: Definitions of Energy: Investigation 2, Parts 1-3; Investigation 3, Parts 1-3; Investigation 4, Parts 1-3</p> <p>Science and Engineering Practices Developing and Using Models: Investigation 1, Part 3; Investigation 2, Parts 2 and 3; Investigation 3, Part 2; Investigation 4, Parts 1 and 2</p> <p>Crosscutting Concepts System and System Models: Investigation 1, Parts 1 and 3; Investigation 2, Parts 2 and 3; Investigation 3, Parts 1-3; Investigation 4, Parts 2 and 3</p>
<p>3.3.6-8.N Construct an argument supported by evidence for how increases in human population and per-capita consumption of natural resources impact Earth's systems.</p>	<p>Disciplinary Core Ideas ESS3.C: Human Impacts on Earth Systems: Investigation 4 Parts 1-3</p> <p>Science and Engineering Practices Engaging in Argument from Evidence: Investigation 1, Part 2; Investigation 2, Part 2; Investigation 4, Parts 1 and 2</p> <p>Crosscutting Concepts Cause and Effect: Investigation 1, Parts 1-3; Investigation 2, Parts 1-3; Investigation 3, Parts 1 and 3; Investigation 4, Parts 1-3</p>

TECHNOLOGY AND ENGINEERING	
ELECTROMAGNETIC FORCE	
3.5.6-8.A Research information from various sources to use and maintain technological products or systems.	Disciplinary Core Ideas ETS1.B: Developing Possible Solutions: Investigation 3, Parts 1-3; Investigation 4, Parts 1-3 Science and Engineering Practices Obtaining, Evaluating, and Communicating Information: Investigation 4, Part 2 Technology and Engineering Practices Communication: Investigation 4, Part 2
3.5.6-8.B Use instruments to gather data on the performance of everyday products.	Disciplinary Core Ideas ETS1.B: Developing Possible Solutions: Investigation 3, Parts 1-3; Investigation 4, Parts 1-3 Science and Engineering Practices Using Mathematics and Computational Thinking: Investigation 3, Part 1 Technology and Engineering Practices Systems Thinking: Investigation 3, Parts 1-3
3.5.6-8.C Hypothesize what alternative outcomes (individual, cultural, and/or environmental) might have resulted had a different technological solution been selected.	Disciplinary Core Ideas NAIP I.8.9: Digital Simulation: Investigation 3, Parts 1 and 3 Science and Engineering Practices Engaging in Argument from Evidence: Investigation 3, Part 1; Investigation 4, Part 2 Technology and Engineering Practices Attention to Ethics: Investigation 3, Parts 1 and 3
3.5.6-8.D Analyze how the creation and use of technologies consumes renewable, nonrenewable, and inexhaustible resources; creates waste; and may contribute to environmental challenges.	Disciplinary Core Ideas NAEP T.8.7: Compare and Justify Environmental Effects: Investigation 3, Part 1 Reading; Investigation 4, Part 2 NAEP T.8.5: Environmental and Economic Trade-Offs: Investigation 3, Part 1 Reading; Investigation 4, Part 2 Science and Engineering Practices Engaging in Argument from Evidence: Investigation 3, Part 1 Reading; Investigation 4, Part 2 Technology and Engineering Practices Attention to Ethics: Investigation 3, Part 1 Reading; Investigation 4, Part 2

TECHNOLOGY AND ENGINEERING	
ELECTROMAGNETIC FORCE	
<p>3.5.6-8.E Consider the impacts of a proposed or existing technology and devise strategies for reducing, reusing, and recycling waste caused by its creation.</p>	<p>Disciplinary Core Ideas NAEP T.8.3: Technological Impacts on Society: Investigation 4, Part 2 Extension Activity</p> <p>Science and Engineering Practices Engaging in Argument from Evidence: Investigation 3, Part 1; Investigation 4, Part 2</p> <p>Technology and Engineering Practices Optimism: Investigation 4, Part 2 Extension Activity</p>
<p>3.5.6-8.F Analyze examples of technologies that have changed the way people think, interact, live, and communicate.</p>	<p>Disciplinary Core Ideas ESS3-3: Earth and Human Activity: Investigation 3, Part 1; Investigation 4, Part 2 Reading</p> <p>Science and Engineering Practices Obtaining, Evaluating, and Communicating Information: Investigation 3, Part 1; Investigation 4, Part 2 Reading</p> <p>Technology and Engineering Practices Critical Thinking: Investigation 2, Parts 1-3; Investigation 3, Parts 1 and 3; Investigation 4, Parts 1 and 2</p>
<p>3.5.6-8.G Analyze how an invention or innovation was influenced by the context and circumstances in which it is developed</p>	<p>Disciplinary Core Ideas ETS1.A: Defining and Delimiting Engineering Problems: Investigation 3, Parts 1-3; Investigation 4, Parts 1-3</p> <p>Science and Engineering Practices Obtaining, Evaluating, and Communicating Information: Investigation 3, Parts 1 and 3; Investigation 4, Parts 1 and 2</p> <p>Technology and Engineering Practices Critical Thinking: Investigation 3, Parts 1 and 3; Investigation 4, Parts 1 and 2</p>
<p>3.5.6-8.I Examine the ways that technology can have both positive and negative effects at the same time.</p>	<p>Disciplinary Core Ideas NAEP T.8.3: Positive and Negative Impacts: Investigation 4, Part 2 Reading</p> <p>Science and Engineering Practices Obtaining, Evaluating, and Communicating Information: Investigation 4, Parts 1 and 2</p> <p>Technology and Engineering Practices Attention to Ethics: Investigation 4, Part 2 Reading</p>

TECHNOLOGY AND ENGINEERING	
ELECTROMAGNETIC FORCE	
3.5.6-8.K Use devices to control technological systems.	<p>Disciplinary Core Ideas ISTE 5D: Automation: Investigation 4 Extension Activity</p> <p>Science and Engineering Practices Using Mathematics and Computational Thinking: Investigation 4, Parts 1 and 2</p> <p>Technology and Engineering Practices Making and Doing: Investigation 2, Parts 1-3; Investigation 3, Parts 1 and 3; Investigation 4, Parts 1 and 2 Systems Thinking: Investigation 2, Parts 1-3; Investigation 3, Parts 1 and 3; Investigation 4, Parts 1 and 2</p>
3.5.6-8.M 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.	<p>Disciplinary Core Ideas ETS1.B: Developing Possible Solutions: Investigation 3, Parts 1-3; Investigation 4, Parts 1-3 ETS1.C: Optimizing the Design Solution: Investigation 3, Parts 2 and 3; Investigation 4, Part 2</p> <p>Science and Engineering Practices Developing and Using Models: Investigation 3, Parts 1-3; Investigation 4, Parts 1-3</p> <p>Technology and Engineering Practices Optimism: Investigation 3, Parts 1-3; Investigation 4, Parts 1-3</p>
3.5.6-8.N 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.	<p>Disciplinary Core Ideas ETS1.B: Developing Possible Solutions: Investigation 3, Parts 1-3; Investigation 4, Parts 1-3 ETS1.C: Optimizing the Design Solution: Investigation 3, Parts 2 and 3; Investigation 4, Part 2</p> <p>Science and Engineering Practices Analyzing and Interpreting Data: Investigation 3, Parts 1-3; Investigation 4, Parts 1-3</p> <p>Technology and Engineering Practices Optimism: Investigation 3, Parts 1-3; Investigation 4, Parts 1-3</p>
3.5.6-8.O Interpret the accuracy of information collected.	<p>Disciplinary Core Ideas ISTE 3B: Evaluate Information: Investigation 3, Parts 1-3; Investigation 4, Parts 1-3</p> <p>Science and Engineering Practices Analyzing and Interpreting Data: Investigation 3, Parts 1-3; Investigation 4, Parts 1-3</p> <p>Technology and Engineering Practices Communication: Investigation 3, Parts 1-3; Investigation 4, Parts 1-3</p>

TECHNOLOGY AND ENGINEERING	
ELECTROMAGNETIC FORCE	
3.5.6-8.P Evaluate competing design solutions using a systematic process to determine how well they meet the criteria and constraints of the problem.	<p>Disciplinary Core Ideas</p> <p>ETS1.B: Developing Possible Solutions: Investigation 3, Parts 1-3; Investigation 4, Parts 1-3</p> <p>Science and Engineering Practices</p> <p>Engaging in Argument from Evidence: Investigation 3, Part 1; Investigation 4, Part 2</p> <p>Technology and Engineering Practices</p> <p>Critical Thinking: Investigation 2, Parts 1-3; Investigation 3, Parts 1 and 3; Investigation 4, Parts 1 and 2</p>
3.5.6-8.Q Apply a technology and engineering design thinking process.	<p>Disciplinary Core Ideas</p> <p>ETS1.B: Developing Possible Solutions: Investigation 3, Parts 1-3; Investigation 4, Parts 1-3</p> <p>Science and Engineering Practices</p> <p>Asking Questions and Defining Problems: Investigation 3, Parts 1-3; Investigation 4, Parts 1-3</p> <p>Technology and Engineering Practices</p> <p>Making and Doing: Investigation 2, Parts 1-3; Investigation 3, Parts 1 and 3; Investigation 4, Parts 1 and 2</p> <p>Creativity: Investigation 2, Parts 1-3; Investigation 3, Parts 1 and 3; Investigation 4, Parts 1 and 2</p>
3.5.6-8.R Develop innovative products and systems that solve problems and extend capabilities based on individual or collective needs and wants.	<p>Disciplinary Core Ideas</p> <p>ETS1.B: Developing Possible Solutions: Investigation 3, Parts 1-3; Investigation 4, Parts 1-3</p> <p>Science and Engineering Practices</p> <p>Constructing Explanations and Designing Solutions: Investigation 3, Parts 1-3; Investigation 4, Parts 1-3</p> <p>Technology and Engineering Practices</p> <p>Making and Doing: Investigation 2, Parts 1-3; Investigation 3, Parts 1 and 3; Investigation 4, Parts 1 and 2</p>
3.5.6-8.S Illustrate the benefits and opportunities associated with different approaches to design.	<p>Disciplinary Core Ideas</p> <p>ETS1.B: Developing Possible Solutions: Investigation 3, Parts 1-3; Investigation 4, Parts 1-3</p> <p>Science and Engineering Practices</p> <p>Obtaining, Evaluating, and Communicating Information: Investigation 3, Parts 1-3; Investigation 4, Parts 1-3</p> <p>Technology and Engineering Practices</p> <p>Optimism: Investigation 3, Parts 1-3; Investigation 4, Parts 1-3</p>

TECHNOLOGY AND ENGINEERING	
ELECTROMAGNETIC FORCE	
<p>3.5.6-8.U Evaluate and assess the strengths and weaknesses of various design solutions given established principles and elements of design.</p>	<p>Disciplinary Core Ideas ETS1.B: Developing Possible Solutions: Investigation 3, Parts 1-3; Investigation 4, Parts 1-3</p> <p>Science and Engineering Practices Engaging in Argument from Evidence: Investigation 3, Part 1; Investigation 4, Part 2</p> <p>Technology and Engineering Practices Optimism: Investigation 2, Parts 1-3; Investigation 3, Parts 1 and 3; Investigation 4, Parts 1 and 2</p>
<p>3.5.6-8.V Refine design solutions to address criteria and constraints.</p>	<p>Disciplinary Core Ideas ETS1.A: Defining and Delimiting Engineering Problems: Investigation 3, Parts 1-3; Investigation 4, Parts 1-3</p> <p>Science and Engineering Practices Asking Questions and Defining Problems: Investigation 3, Parts 1-3; Investigation 4, Parts 1-3</p> <p>Technology and Engineering Practices Making and Doing: Investigation 2, Parts 1-3; Investigation 3, Parts 1 and 3; Investigation 4, Parts 1 and 2 Optimism: Investigation 2, Parts 1-3; Investigation 3, Parts 1 and 3; Investigation 4, Parts 1 and 2</p>
<p>3.5.6-8.W 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.</p>	<p>Disciplinary Core Ideas ETS1.A: Defining and Delimiting Engineering Problems: Investigation 3, Parts 1-3; Investigation 4, Parts 1-3</p> <p>Science and Engineering Practices Asking Questions and Defining Problems: Investigation 3, Parts 1-3; Investigation 4, Parts 1-3</p> <p>Technology and Engineering Practices Critical Thinking: Investigation 2, Parts 1-3; Investigation 3, Parts 1 and 3; Investigation 4, Parts 1 and 2</p>
<p>3.5.6-8.X Defend decisions related to a design problem.</p>	<p>Disciplinary Core Ideas ETS1.B: Developing Possible Solutions: Investigation 3, Parts 1-3; Investigation 4, Parts 1-3</p> <p>Science and Engineering Practices Engaging in Argument from Evidence: Investigation 3, Part 1; Investigation 4, Part 2</p> <p>Technology and Engineering Practices Critical Thinking: Investigation 2, Parts 1-3; Investigation 3, Parts 1 and 3; Investigation 4, Parts 1 and 2</p>

TECHNOLOGY AND ENGINEERING	
ELECTROMAGNETIC FORCE	
<p>3.5.6-8.Y Compare, contrast, and identify overlap between the contributions of science, technology, engineering, and mathematics in the development of technological systems.</p>	<p>Disciplinary Core Ideas NAEP D.8.1: Investigating the Natural World: Investigation 3, Parts 1, 3 and Extension Activity; Investigation 4, Part 2 Reading</p> <p>Science and Engineering Practices Obtaining, Evaluating, and Communicating Information: Investigation 3, Parts 1 and 3; Investigation 4, Parts 1 and 2</p> <p>Technology and Engineering Practices Collaboration: Investigation 3, Parts 1 and 3; Investigation 4, Parts 1 and 2</p>
<p>3.5.6-8.AA Adapt and apply an existing product, system, or process to solve a problem in a different setting.</p>	<p>Disciplinary Core Ideas ETS1.C: Optimizing the Design Solution: Investigation 3, Parts 2 and 3; Investigation 4, Part 2</p> <p>Science and Engineering Practices Constructing Explanations and Designing Solutions: Investigation 2, Parts 1-3; Investigation 3, Parts 1 and 3; Investigation 4, Parts 1 and 2</p> <p>Technology and Engineering Practices Making and Doing: Investigation 2, Parts 1-3; Investigation 3, Parts 1 and 3; Investigation 4, Parts 1 and 2 Creativity: Investigation 2, Parts 1-3; Investigation 3, Parts 1 and 3; Investigation 4, Parts 1 and 2</p>
<p>3.5.6-8.BB Demonstrate how knowledge gained from other content areas affects the development of technological products and systems.</p>	<p>Disciplinary Core Ideas ETS1.C: Optimizing the Design Solution: Investigation 3, Parts 2 and 3; Investigation 4, Part 2</p> <p>Science and Engineering Practices Obtaining, Evaluating, and Communicating Information: Investigation 3, Parts 2 and 3; Investigation 4, Part 2</p> <p>Technology and Engineering Practices Making and Doing: Investigation 2, Parts 1-3; Investigation 3, Parts 1 and 3; Investigation 4, Parts 1 and 2 Optimism: Investigation 2, Parts 1-3; Investigation 3, Parts 1 and 3; Investigation 4, Parts 1 and 2</p>
<p>3.5.6-8.CC Consider historical factors that have contributed to the development of technologies and human progress.</p>	<p>Disciplinary Core Ideas ETS1.B: Developing Possible Solutions: Investigation 3, Parts 1-3; Investigation 4, Parts 1-3</p> <p>Science and Engineering Practices Asking Questions and Defining Problems: Investigation 3, Parts 2 and 3; Investigation 4, Part 2</p> <p>Technology and Engineering Practices Optimism: Investigation 2, Parts 1-3; Investigation 3, Parts 1 and 3; Investigation 4, Parts 1 and 2</p>

TECHNOLOGY AND ENGINEERING	
ELECTROMAGNETIC FORCE	
<p>3.5.6-8.DD Engage in a research and development process to simulate how inventions and innovations have evolved through systematic tests and refinements.</p>	<p>Disciplinary Core Ideas ETS1.B: Developing Possible Solutions: Investigation 3, Parts 1-3; Investigation 4, Parts 1-3</p> <p>Science and Engineering Practices Asking Questions and Defining Problems: Investigation 3, Parts 2 and 3; Investigation 4, Part 2</p> <p>Technology and Engineering Practices Optimism: Investigation 2, Parts 1-3; Investigation 3, Parts 1 and 3; Investigation 4, Parts 1 and 2</p>
<p>3.5.6-8.EE Differentiate between inputs, processes, outputs, and feedback in technological systems.</p>	<p>Disciplinary Core Ideas NAEP D.8.11: Systems Processes and Goals: Investigation 4, Part 1</p> <p>Science and Engineering Practices Obtaining, Evaluating, and Communicating Information: Investigation 3, Parts 2 and 3; Investigation 4, Part 2</p> <p>Technology and Engineering Practices Systems Thinking: Investigation 3, Parts 2 and 3; Investigation 4, Part 2 Making and Doing: Investigation 2, Parts 1-3; Investigation 3, Parts 1 and 3; Investigation 4, Parts 1 and 2</p>
<p>3.5.6-8.FF Demonstrate how systems thinking involves considering relationships between every part, as well as how the systems interact with the environment in which it is used.</p>	<p>Disciplinary Core Ideas NAEP D.8.11: Systems Processes and Goals: Investigation 3, Part 2; Investigation 4, Part 2 and Extension Activity</p> <p>Science and Engineering Practices Developing and Using Models: Investigation 3, Part 2; Investigation 4, Part 2 and Extension Activity</p> <p>Technology and Engineering Practices Systems Thinking: Investigation 3, Parts 2 and 3; Investigation 4, Part 2 and Extension Activity Attention to Ethics: Investigation 3, Part 2; Investigation 4, Part 2 and Extension Activity</p>
<p>3.5.6-8.HH Create a closed-loop system that has a feedback path and requires no human intervention.</p>	<p>Disciplinary Core Ideas ETS1.B: Developing Possible Solutions: Investigation 3, Parts 1-3; Investigation 4, Parts 1-3</p> <p>Science and Engineering Practices Developing and Using Models: Investigation 3, Part 2; Investigation 4, Part 2 and Extension Activity</p> <p>Technology and Engineering Practices Systems Thinking: Making and Doing: Investigation 2, Parts 1-3; Investigation 3, Parts 1 and 3; Investigation 4, Parts 1 and 2</p>

TECHNOLOGY AND ENGINEERING	
ELECTROMAGNETIC FORCE	
<p>3.5.6-8.II Predict outcomes of a future product or system at the beginning of the design process.</p>	<p>Disciplinary Core Ideas ETS1.C: Optimizing the Design Solution: Investigation 3, Parts 2 and 3; Investigation 4, Part 2</p> <p>Science and Engineering Practices Developing and Using Models: Investigation 3, Parts 1 and 3; Investigation 4, Parts 1 and 2</p> <p>Technology and Engineering Practices Systems Thinking: Investigation 3, Part 2; Investigation 4, Part 2 and Extension Activity Making and Doing: Investigation 2, Parts 1-3; Investigation 3, Parts 1 and 3; Investigation 4, Parts 1 and 2</p>
<p>3.5.6-8.JJ Apply informed problem-solving strategies to the improvement of existing devices or processes or the development of new approaches.</p>	<p>Disciplinary Core Ideas ETS1.C: Optimizing the Design Solution: Investigation 3, Parts 2 and 3; Investigation 4, Part 2</p> <p>Science and Engineering Practices Asking Questions and Defining Problems: Investigation 3, Parts 1-3; Investigation 4, Parts 1 and 2</p> <p>Technology and Engineering Practices Making and Doing: Investigation 2, Parts 1-3; Investigation 3, Parts 1 and 3; Investigation 4, Parts 1 and 2 Optimism: Investigation 2, Parts 1-3; Investigation 3, Parts 1 and 3; Investigation 4, Parts 1 and 2</p>
<p>3.5.6-8.LL Compare how different technologies involve different sets of processes.</p>	<p>Disciplinary Core Ideas ETS1.B: Developing Possible Solutions: Investigation 3, Parts 1-3; Investigation 4, Parts 1-3</p> <p>Science and Engineering Practices Obtaining, Evaluating, and Communicating Information: Investigation 3, Parts 1-3; Investigation 4, Parts 1-3</p> <p>Technology and Engineering Practices Systems Thinking: Investigation 3, Parts 1-3; Investigation 4, Parts 1-3</p>

SCIENCE

HEREDITY AND ADAPTATION

<p>3.1.6-8.M 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.</p>	<p>Disciplinary Core Ideas LS3.A: Inheritance of Traits: Investigation 2 Parts 1-4; Investigation 3 Parts 1-3 LS3.B: Variation of Traits: Investigation 2 Parts 1-4; Investigation 3 Parts 1-3</p> <p>Science and Engineering Practices Developing and Using Models: Investigation 2 Parts 1, 3 and 4; Investigation 3 Parts 1 and 2</p> <p>Crosscutting Concepts Structure and Function: Investigation 1 Part 2; Investigation 3 Part 1</p>
<p>3.1.6-8.N 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.</p>	<p>Disciplinary Core Ideas LS3.A: Inheritance of Traits: Investigation 2 Parts 1-4; Investigation 3 Parts 1-3 LS3.B: Variation of Traits: Investigation 2 Parts 1-4; Investigation 3 Parts 1-3</p> <p>Science and Engineering Practices Developing and Using Models: Investigation 2 Parts 1, 3 and 4; Investigation 3 Parts 1 and 2</p> <p>Crosscutting Concepts Cause and Effect: Investigation 2 Parts 2 and 4; Investigation 3 Parts 1-3</p>
<p>3.1.6-8.O 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 the Earth under the assumption that natural laws operate today as in the past.</p>	<p>Disciplinary Core Ideas LS4.A: Evidence of Common Ancestry and Diversity: Investigation 1 Parts 1 and 2; Investigation 2 Parts 1-4; Investigation 3 Part 2</p> <p>Science and Engineering Practices Analyzing and Interpreting Data: Investigation 1 Parts 1 and 2; Investigation 2 Parts 2-4</p> <p>Crosscutting Concepts Patterns: Investigation 1 Part 2; Investigation 2 Parts 1-4; Investigation 3 Parts 1-3</p>

SCIENCE

HEREDITY AND ADAPTATION

<p>3.1.6-8.P 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.</p>	<p>Disciplinary Core Ideas LS4.A: Evidence of Common Ancestry and Diversity: Investigation 1 Parts 1 and 2; Investigation 2 Parts 1-4; Investigation 3 Part 2</p> <p>Science and Engineering Practices Constructing Explanations and Designing Solutions: Investigation 1 Part 2; Investigation 2 Parts 2 and 3; Investigation 3 Parts 2 and 3</p> <p>Crosscutting Concepts Patterns: Investigation 1 Part 2; Investigation 2 Parts 1-4; Investigation 3 Parts 1-3</p>
<p>3.1.6-8.Q Analyze displays of pictorial data to compare patterns of similarities in the anatomical structures across multiple species to identify relationships note evidence in the fully formed anatomy.</p>	<p>Disciplinary Core Ideas LS4.A: Evidence of Common Ancestry and Diversity: Investigation 1 Parts 1 and 2; Investigation 2 Parts 1-4; Investigation 3 Part 2</p> <p>Science and Engineering Practices Analyzing and Interpreting Data: Investigation 1 Parts 1 and 2; Investigation 2 Parts 2-4</p> <p>Crosscutting Concepts Patterns: Investigation 1 Part 2; Investigation 2 Parts 1-4; Investigation 3 Parts 1-3</p>
<p>3.1.6-8.R Gather and synthesize information about technologies that have changed the way humans influence the inheritance of desired traits in organisms.</p>	<p>Disciplinary Core Ideas LS4.B: Natural Selection: Investigation 3 Parts 1-3</p> <p>Science and Engineering Practices Obtaining, Evaluating, and Communicating Information: Investigation 1 Parts 1 and 2; Investigation 2 Parts 2-4; Investigation 3 Parts 1-3</p> <p>Crosscutting Concepts Cause and Effect: Investigation 2 Parts 2 and 4; Investigation 3 Parts 1-3</p>

SCIENCE

HEREDITY AND ADAPTATION

<p>3.1.6-8.S 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.</p>	<p>Disciplinary Core Ideas LS4.B: Natural Selection: Investigation 3 Parts 1-3</p> <p>Science and Engineering Practices Constructing Explanations and Designing Solutions: Investigation 1 Part 2; Investigation 2 Parts 2 and 3; Investigation 3 Parts 2 and 3</p> <p>Crosscutting Concepts Cause and Effect: Investigation 2 Parts 2 and 4; Investigation 3 Parts 1-3</p>
<p>3.1.6-8.T Use mathematical representations to support explanations of how natural selection may lead to increases and decreases of specific traits in populations over time.</p>	<p>Disciplinary Core Ideas LS4.C: Adaptation: Investigation 3 Parts 1-3</p> <p>Science and Engineering Practices Using Mathematical and Computational Thinking: Investigation 2 Parts 3 and 4; Investigation 3 Part 2</p> <p>Crosscutting Concepts Cause and Effect: Investigation 2 Parts 2 and 4; Investigation 3 Parts 1-3</p>

ENVIRONMENTAL LITERACY AND SUSTAINABILITY

HEREDITY AND ADAPTATION

<p>3.4.6-8.A Develop a model to describe how agricultural and food systems function, including the sustainable use of natural resources and the production, processing, and management of food, fiber, and energy.</p>	<p>Disciplinary Core Ideas ESS3.A: Natural Resources: Investigation 3, Part 2 Reading and Part 3 Reading</p> <p>Science and Engineering Practices Developing and Using Models: Investigation 3, Part 2 Reading and Part 3 Reading</p> <p>Crosscutting Concepts Systems and System Models: Investigation 3, Part 2 Reading and Part 3 Reading</p>
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ENVIRONMENTAL LITERACY AND SUSTAINABILITY
HEREDITY AND ADAPTATION

<p>3.4.6-8.D Gather, read, and synthesize information from multiple sources to investigate how Pennsylvania environmental issues affect Pennsylvania’s human and natural systems.</p>	<p>Disciplinary Core Ideas ESS3.C: Human Impacts on Earth Systems: Investigation 1 Extension Activity; Investigation 3 Reading LS2.C: Ecosystem Dynamics, Functioning, and Resilience: Investigation 1 Extension Activity; Investigation 3 Reading</p> <p>Science and Engineering Practices Obtaining, Evaluating, and Communicating Information: Investigation 1 Extension Activity; Investigation 3 Reading</p> <p>Crosscutting Concepts Cause and Effect: Investigation 1 Extension Activity; Investigation 3 Reading Stability and Change: Investigation 1 Extension Activity; Investigation 3 Reading</p>
<p>3.4.6-8.F Obtain and communicate information on how integrated pest management could improve indoor and outdoor environments.</p>	<p>Disciplinary Core Ideas ESS3.C: Human Impacts on Earth Systems: Investigation 3, Part 3 Reading</p> <p>Science and Engineering Practices Obtaining, Evaluating, and Communicating Information: Investigation 3, Part 3 Reading</p> <p>Crosscutting Concepts Cause and Effect: Investigation 3, Part 3 Reading Stability and Change: Investigation 3, Part 3 Reading</p>
<p>3.4.6-8.G Obtain and communicate information to describe how best resource management practices and environmental laws are designed to achieve environmental sustainability.</p>	<p>Disciplinary Core Ideas ESS3.C: Human Impacts on Earth Systems: Investigation 1, Part 1 Reading, Extension Activity and Home/School Connection ETS1.B: Developing Possible Solutions: Investigation 1, Part 1 Reading, Extension Activity and Home/School Connection</p> <p>Science and Engineering Practices Obtaining, Evaluating, and Communicating Information: Investigation 1, Part 1 Reading, Extension Activity and Home/School Connection</p> <p>Crosscutting Concepts Cause and Effect: Investigation 1, Part 1 Reading, Extension Activity and Home/School Connection Stability and Change: Investigation 1, Part 1 Reading, Extension Activity and Home/School Connection</p>
<p>3.4.6-8.H Design a solution to an environmental issue in which individuals and societies can engage as stewards of the environment.</p>	<p>Disciplinary Core Ideas ETS1.B: Developing Possible Solutions: Investigation 1, Extension Activity ESS3.C: Human Impacts on Earth Systems: Investigation 1, Extension Activity</p> <p>Science and Engineering Practices Constructing Explanations and Designing Solutions: Investigation 1, Extension Activity</p> <p>Crosscutting Concepts Science Addresses Questions About the Natural and Material World: Investigation 1, Extension Activity</p>

ENVIRONMENTAL LITERACY AND SUSTAINABILITY
HEREDITY AND ADAPTATION

<p>3.4.6-8.I Construct an explanation that describes regional environmental conditions and their implications on environmental justice and social equity.</p>	<p>Disciplinary Core Ideas LS4.D: Biodiversity and Humans: Investigation 1, Extension Activity; Investigation 3, Extension Activity</p> <p>Science and Engineering Practices Obtaining, Evaluating, and Communicating Information: Investigation 1, Extension Activity; Investigation 3, Extension Activity</p> <p>Science and Engineering Practices Cause and Effect: Investigation 1, Extension Activity; Investigation 3, Extension Activity</p>
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TECHNOLOGY AND ENGINEERING
HEREDITY AND ADAPTATION

<p>3.5.6-8.F Analyze examples of technologies that have changed the way people think, interact, live, and communicate.</p>	<p>Disciplinary Core Ideas ESS3-3: Earth and Human Activity: Investigation 3 Extension Activity</p> <p>Science and Engineering Practices Obtaining, Evaluating, and Communicating Information: Investigation 3 Extension Activity</p> <p>Technology and Engineering Practices Critical Thinking: Investigation 3 Extension Activity</p>
<p>3.5.6-8.S Illustrate the benefits and opportunities associated with different approaches to design.</p>	<p>Disciplinary Core Ideas ETS1.B: Developing Possible Solutions: Investigation 3 Extension Activity</p> <p>Science and Engineering Practices Obtaining, Evaluating, and Communicating Information: Investigation 3 Extension Activity</p> <p>Technology and Engineering Practices Optimism: Investigation 3 Extension Activity</p>

FOSS 8th Grade Assessment Opportunities

Disciplinary Core Ideas Assessment Opportunities – 8th Grade

Course	Inv.	Disciplinary Core Ideas																						
		PS2.A	PS2.B	PS3.A	PS3.B	PS4.A	PS4.B	PS4.C	LS3.A	LS3.B	LS4.A	LS4.B	LS4.C	ESS1.A	ESS1.B	ESS1.C	ESS2.A	ESS2.C	ESS3.A	ESS3.B	ESS3.C	ETS1.A	ETS1.B	ETS1.C
Heredity and Adaptation	1										x													
	2								x	x	x													
	3								x	x	x	x	x											
Electro-magnetic Force	1	x	x																					
	2	x	x	x																				
	3		x	x																			x	x
	4	x	x	x	x																	x	x	x
Gravity and Kinetic Energy	1	x	x																					
	2	x	x											x	x									
	3	x		x	x																			
	4	x	x		x										x								x	x
Waves	1					x																		
	2					x																	x	x
	3					x	x																	
	4							x																
Planetary Science	1														x							x		
	2														x	x								
	3														x	x								
	4														x									
	5														x	x	x	x			x		x	
	6		x					x							x	x								
	7															x		x	x	x		x		
	8							x															x	
	9		x												x	x								

Science and Engineering Practices Assessment Opportunities – 8th Grade

Course	Inv.	Science and Engineering Practices							
		Asking Questions and Defining Problems	Developing and Using Models	Planning and Carrying Out Investigations	Analyzing and Interpreting Data	Using Mathematics and Computational Thinking	Constructing Explanations and Designing Solutions	Engaging in Argument from Evidence	Obtaining, Evaluating, and Communicating Information
Heredity and Adaptation	1				x		x		x
	2		x		x	x	x		x
	3		x			x	x		x
Electromagnetic Force	1	x	x	x	x		x	x	
	2	x	x	x	x		x	x	
	3	x	x	x	x		x		
	4	x	x	x	x		x	x	
Gravity and Kinetic Energy	1	x	x	x	x		x		
	2	x	x	x	x		x		
	3	x	x	x	x		x		
	4	x	x	x	x		x	x	
Waves	1	x	x		x	x			
	2	x	x		x	x		x	x
	3	x	x		x				x
	4	x	x		x	x			x
Planetary Science	1	x	x		x				
	2	x	x		x		x	x	
	3	x	x						
	4	x	x		x		x		
	5	x	x		x		x	x	
	6	x	x		x		x	x	
	7	x	x		x		x	x	
	8	x	x		x		x		
	9	x	x		x		x	x	

Crosscutting Concepts Assessment Opportunities – 8th Grade

Course	Inv.	Crosscutting Concepts						
		Patterns	Cause and Effect	Scale, Proportion, and Quantity	Systems and System Models	Energy and Matter in Systems	Structure and Function	Stability and Change of Systems
Heredity and Adaptation	1	x		x			x	
	2	x	x					
	3	x	x				x	
	4							
Electro-magnetic Force	1		x		x	x		x
	2		x		x	x		
	3		x		x	x		
	4		x		x	x		x
Gravity and Kinetic Energy	1			x	x			
	2		x	x	x			x
	3		x	x	x	x		x
	4		x	x	x	x		x
Waves	1	x						
	2	x					x	
	3	x						
	4	x					x	
Planetary Science	1	x		x	x			
	2	x	x	x		x	x	
	3	x		x	x			
	4	x	x		x			
	5	x	x	x	x			
	6		x	x	x			
	7	x	x	x	x			
	8	x		x		x		
	9	x	x	x	x			