SCIENCE STANDARDS (DCI)	Intro Learning Activities					Field Learning Activities			Protocols				Data Analysis			Scientific Process			SCIENCE STANDARDS (DCI)	Modeling			Plant-A-Plant Classroom Experiments										
▯ = covered directly in activities ▯ = addressed, but not directly covered.	Paper Clip Factory Analogy	Carbon Cycle Adventure Story	Carbon Travels Game	Getting to Know the Global Carbon Cycle	Pencil Carbon Storage	Biomass Units	Allometry: Not A Llama Tree	Percent Cover	Carbon Cycle Site Selection	Carbon Cycle Site Set Up	How to Measure Trees	Tree Shrub and Herbaceous Protocols	Biomass Analysis	Determining Scale & Calculating Area	NPP Analysis	Posing Research Questions	Develop Investigation Plan	Identifying New Research Questions	▯ = covered directly in activities ▯ = addressed, but not directly covered.	Biomass Accumulation Model	Global C Cycle Model	Plant Growth Models	Seed Germination	Light Experiment	Mineral Nutrition Experiment	Water Experiment	Carbon Dioxide Experiment	Mineral Nutrition II	Water II	CO2 II	Photosynthesis	Temperature	Soil Respiration
Grades 6-8																			Grades 6-8													
Physical Science																			**Physical Science**													
PS1. Matter and Its Interactions																			**PS1. Matter and Its Interactions**													
PS1.A Structure and Properties of Matter		✓	✓																PS1.A Structure and Properties of Matter													
PS1.B Chemical Reactions		✔	✔																PS1.B Chemical Reactions								✓					
PS2. Motion and Stability: Forces and Interactions																			**PS2. Motion and Stability: Forces and Interactions**													
PS2.A Forces and Motion																			PS2.A Forces and Motion													
PS2.B Types of Interactions																			PS2.B Types of Interactions													
PS3. Energy																			**PS3. Energy**													
PS3.A Definitions of Energy																			PS3.A Definitions of Energy													
PS3.B Conservation of Energy and Energy Transfer																			PS3.B Conservation of Energy and Energy Transfer													
PS3. C Relationship between Energy and Forces																			PS3. C Relationship between Energy and Forces													
PS3.D Energy in Chemical Processes and Everyday Life		✔	✔																PS3.D Energy in Chemical Processes and Everyday Life													
PS4. Waves and their Applications in Technologies for Information Transfer																			**PS4. Waves and their Applications in Technologies for Information Transfer**													
PS4.A Wave Properties																			PS4.A Wave Properties													
PS4.B Electromagnetic Radiation																			PS4.B Electromagnetic Radiation													
PS4.C Information Technology and Instrumentation																			PS4.C Information Technology and Instrumentation													
Life Science																			**Life Science**													
LS1. From Molecules to Organisms: Structures and Processes																			**LS1. From Molecules to Organisms: Structures and Processes**													
LS1.A Structure and Function							✓												LS1.A Structure and Function													
LS1.B Growth and Development of Organisms																			LS1.B Growth and Development of Organisms			✓	✓	✔	✓	✓	✓	✓	✓	✔	✓	✓
LS1.C Organization for Matter and Energy Flow in Organisms		✔	✔																LS1.C Organization for Matter and Energy Flow in Organisms			✔		✔	✓	✓	✓	✓	✓	✔	✓	✓
LS1.D Information Processing																			LS1.D Information Processing													
LS2. Ecosystems: Interactions, Energy, and Dynamics																			**LS2. Ecosystems: Interactions, Energy, and Dynamics**													
LS2.A Interdependent Relationships in Ecosystems		✔					✓												LS2.A Independent Relationships in Ecosystems	✓		✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔
LS2.B Cycle of Matter and Energy Transfer in Ecosystems		✔	✔	✔															LS2.B Cycle of Matter and Energy Transfer in Ecosystems	✓	✔											
LS2.C Ecosystem Dynamics, Functioning and Resilience		✓																	LS2.C Ecosystem Dynamics, Functioning and Resilience	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔
LS3. Heredity: Inheritance and Variation of Traits																			**LS3. Heredity: Inheritance and Variation of Traits**													
LS3.A Inheritance of Traits																			LS3.A Inheritance of Traits													
LS3.B Variation of Traits																			LS3.B Variation of Traits													
LS4. Biological Evolution: Unity and Diversity																			**LS4. Biological Evolution: Unity and Diversity**													
LS4.A Evidence of Common Ancestry and Diversity												✓							LS4.A Evidence of Common Ancestry and Diversity													
LS4.B Natural Selection																			LS4.B Natural Selection													
LS4.C Adaptation																			LS4.C Adaptation													
LS4.D Biodiversity and Humans																			LS4.D Biodiversity and Humans													
Earth and Space Science																			**Earth and Space Science**													
ESS1.Earth's Place in the Universe																			**ESS1.Earth's Place in the Universe**													
ESS1.A The Universe and Its Stars																			ESS1.A The Universe and Its Stars													
ESS1.B Earth and the Solar System																			ESS1.B Earth and the Solar System													
ESS1.C The History of Planet Earth																			ESS1.C The History of Planet Earth													
ESS2 .Earth's System																			**ESS2 .Earth's System**													
ESS2.A Earth's Materials and Systems	✓		✔	✔															ESS2.A Earth's Materials and Systems		✔											
ESS2.B Plate Techtonics and Large-Scale System Interactions																			ESS2.B Plate Techtonics and Large-Scale System Interactions													
ESS2.C The Roles of Water in Earth's Surface Processes		✓																	ESS2.C The Roles of Water in Earth's Surface Processes													
ESS2.D Weather and Climate																			ESS2.D Weather and Climate													
ESS2.E Biogeology																			ESS2.E Biogeology													
ESS3. Earth and Human Activity																			**ESS3. Earth and Human Activity**													
ESS3.A Natural Resources		✓	✓	✓		✔							✓						ESS3.A Natural Resources		✔											
ESS3.B Natural Hazards																			ESS3.B Natural Hazards													
ESS3.C Human Impacts on Earth System		✓	✔	✔											✓				ESS3.C Human Impacts on Earth System	✓	✔	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
ESS3.D Global Climate Change				✓		✓													ESS3.D Global Climate Change		✓											
ETS1. Engineering Design																			**ETS1. Engineering Design**													
ETS1.A Defining and Delimiting Engineering Problems																			ETS1.A Defining and Delimiting Engineering Problems													
ETS1.B Developing Possible Solutions	✔					✓	✓												ETS1.B Developing Possible Solutions	✔	✔	✔										
ETS1.C Optimizing the Design Solution	✔					✓	✓												ETS.C Optimizing the Design Solution	✔	✔	✔										

SCIENCE STANDARDS (DCI)	Introductory Learning Activities					Field Learning Activities			Protocols				Data Analysis			Scientific Process			SCIENCE STANDARDS (DCI)	Modeling Activities			Plant-A-Plant Classroom Experiments											
✔ = covered directly in activities ✔ = addressed, but not directly covered.	Paper Clip Factory Analogy	Carbon Cycle Adventure Story	Carbon Travels Game	Getting to Know the Global Carbon Cycle	Pencil Carbon Storage	Biomass Units	Allometry: Not A Llama Tree	Percent Cover	Carbon Cycle Site Selection	Carbon Cycle Site Set Up	How to Measure Trees	Tree Shrub and Herbaceous Protocols	Biomass Analysis	Determining Scale & Calculating Area	NPP Analysis	Posing Research Questions	Develop Investigation Plan	Identifying New Research Questions	✔ = covered directly in activities ✔ = addressed, but not directly covered.	Biomass Accumulation Model	Global C Cycle Model	Plant Growth Models	Seed Germination	Light Experiment	Mineral Nutrition Experiment	Water Experiment	Carbon Dioxide Experiment	Mineral Nutrition II	Water II	CO2 II	Photosynthesis	Temperature	Soil Respiration
Grades 9-12																			Grades 9-12													
Physical Science																			**Physical Science**													
PS1. Matter and Its Interactions																			**PS1. Matter and Its Interactions**													
PS1.A Structure and Properties of Matter		✔																	PS1.A Structure and Properties of Matter													
PS1.B Chemical Reactions		✔																	PS1.B Chemical Reactions								✔					
PS2. Motion and Stability: Forces and Interactions																			**PS2. Motion and Stability: Forces and Interactions**													
PS2.A Forces and Motion																			PS2.A Forces and Motion													
PS2.B Types of Interactions																			PS2.B Types of Interactions													
PS3. Energy																			**PS3. Energy**													
PS3.A Definitions of Energy																			PS3.A Definitions of Energy													
PS3.B Conservation of Energy and Energy Transfer		✔	✔	✔															PS3.B Conservation of Energy and Energy Transfer													
PS3. C Relationship between Energy and Forces																			PS3. C Relationship between Energy and Forces													
PS3.D Energy in Chemical Processes and Everyday Life		✔	✔	✔															PS3.D Energy in Chemical Processes and Everyday Life													
PS4. Waves and their Applications in Technologies for Information Transfer																			**PS4. Waves and their Applications in Technologies for Information Transfer**													
PS4.A Wave Properties																			PS4.A Wave Properties													
PS4.B Electromagnetic Radiation																			PS4.B Electromagnetic Radiation													
PS4.C Information Technology and Instrumentation																			PS4.C Information Technology and Instrumentation													
Life Science																			**Life Science**													
LS1. From Molecules to Organisms: Structures and Processes																			**LS1. From Molecules to Organisms: Structures and Processes**													
LS1.A Structure and Function							✔												LS1.A Structure and Function													
LS1.B Growth and Development of Organisms																			LS1.B Growth and Development of Organisms			✔		✔	✔	✔	✔	✔	✔	✔	✔	✔	✔
LS1.C Organization for Matter and Energy Flow in Organisms		✔	✔																LS1.C Organization for Matter and Energy Flow in Organisms													
LS1.D Information Processing																			LS1.D Information Processing													
LS2. Ecosystems: Interactions, Energy, and Dynamics																			**LS2. Ecosystems: Interactions, Energy, and Dynamics**													
LS2.A Interdependent Relationships in Ecosystems																			LS2.A Independent Relationships in Ecosystems	✔												
LS2.B Cycle of Matter and Energy Transfer in Ecosystems		✔	✔	✔															LS2.B Cycle of Matter and Energy Transfer in Ecosystems	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔
LS2.C Ecosystem Dynamics, Functioning and Resilience		✔	✔	✔															LS2.C Ecosystem Dynamics, Functioning and Resilience	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔
LS3. Heredity: Inheritance and Variation of Traits																			**LS3. Heredity: Inheritance and Variation of Traits**													
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LS3.B Variation of Traits																			LS3.B Variation of Traits													
LS4. Biological Evolution: Unity and Diversity																			**LS4. Biological Evolution: Unity and Diversity**													
LS4.A Evidence of Common Ancestry and Diversity																			LS4.A Evidence of Common Ancestry and Diversity													
LS4.B Natural Selection																			LS4.B Natural Selection													
LS4.C Adaptation																			LS4.C Adaptation													
LS4.D Biodiversity and Humans							✔												LS4.D Biodiversity and Humans													
Earth and Space Science																			**Earth and Space Science**													
ESS1.Earth's Place in the Universe																			**ESS1.Earth's Place in the Universe**													
ESS1.A The Universe and Its Stars																			ESS1.A The Universe and Its Stars													
ESS1.B Earth and the Solar System																			ESS1.B Earth and the Solar System													
ESS1.C The History of Planet Earth																			ESS1.C The History of Planet Earth													
ESS2 .Earth's System																			**ESS2 .Earth's System**													
ESS2.A Earth's Materials and Systems			✔	✔															ESS2.A Earth's Materials and Systems		✔											
ESS2.B Plate Techtonics and Large-Scale System Interactions																			ESS2.B Plate Techtonics and Large-Scale System Interactions													
ESS2.C The Roles of Water in Earth's Surface Processes		✔																	ESS2.C The Roles of Water in Earth's Surface Processes													
ESS2.D Weather and Climate				✔															ESS2.D Weather and Climate													
ESS2.E Biogeology		✔	✔	✔															ESS2.E Biogeology													
ESS3. Earth and Human Activity																			**ESS3. Earth and Human Activity**													
ESS3.A Natural Resources			✔	✔									✔						ESS3.A Natural Resources	✔	✔											
ESS3.B Natural Hazards																			ESS3.B Natural Hazards													
ESS3.C Human Impacts on Earth System			✔	✔											✔				ESS3.C Human Impacts on Earth System	✔	✔											
ESS3.D Global Climate Change				✔															ESS3.D Global Climate Change		✔											
ETS1. Engineering Design																			**ETS1. Engineering Design**													
ETS1.A Defining and Delimiting Engineering Problems																			ETS1.A Defining and Delimiting Engineering Problems													
ETS1.B Developing Possible Solutions	✔																		ETS1.B Developing Possible Solutions	✔	✔	✔										
ETS1.C Optimizing the Design Solution	✔																		ETS.C Optimizing the Design Solution	✔	✔	✔										

Practices	Introductory Activities					Field Learning Activities			Protocols				Data Analysis			Scientific Process			Practices	Modeling Activities			Plant-A-Plant Classroom Experiments										
✔ = covered directly in activities ✔ = addressed, but not directly covered.	Paper Clip Factory Analogy	Carbon Cycle Adventure Story	Carbon Travels Game	Getting to Know the Global Carbon Cycle	Pencil Carbon Storage	Biomass Units	Allometry: Not A Llama Tree	Percent Cover	How to Measure Trees	Carbon Cycle Site Selection	Carbon Cycle Site Set Up	Tree Shrub and Herbaceous Protocols	Biomass Analysis	Determining Scale & Calculating Area	NPP Analysis	Posing Research Questions	Develop Investigation Plan	Identifying New Research Questions	✔ = covered directly in activities ✔ = addressed, but not directly covered.	Biomass Accumulation Model	Global C Cycle Model	Plant Growth Models	Seed Germination	Light Experiment	Mineral Nutrition Experiment	Water Experiment	Carbon Dioxide Experiment	Mineral Nutrition II	Water II	CO_2 II	Photosynthesis	Temperature	Soil Respiration
Grades 6-12																			Grades 6-12													
Science & Engineering Practices (NGSS)																			**Science & Engineering Practices (NGSS)**												
S1. Asking questions (for science) and defining problems (for engineering).		✔	✔	✔			✔			✔						✔		✔	S1. Asking questions (for science) and defining problems (for engineering).	✔				✔	✔	✔	✔	✔	✔	✔	✔	✔	✔
S2. Developing and using models.	✔	✔	✔	✔			✔						✔						S2. Developing and using models.	✔	✔	✔											
S3. Planning and carrying out investigations.					✔	✔				✔	✔	✔					✔		S3. Planning and carrying out investigations.	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔
S4. Analyzing and interpreting data.	✔	✔	✔			✔	✔	✔	✔				✔	✔	✔				S4. Analyzing and interpreting data.	✔	✔	✔		✔	✔	✔	✔	✔	✔	✔	✔	✔	✔
S5. Using mathematics and computational thinking.	✔			✔	✔	✔	✔	✔	✔		✔	✔	✔	✔	✔		✔		S5. Using mathematics and computational thinking.	✔	✔	✔		✔	✔	✔	✔	✔	✔	✔	✔	✔	✔
S6. Constructing explanations (for science) and designing solutions (for engineering).			✔										✔		✔				S6. Constructing explanations (for science) and designing solutions (for engineering).	✔	✔	✔		✔	✔	✔	✔	✔	✔	✔	✔	✔	✔
S7. Engaging in argument from evidence.	✔																		S7. Engaging in argument from evidence.					✔	✔	✔	✔	✔	✔	✔	✔	✔	✔
S8. Obtaining, evaluating, and communicating information.			✔	✔															S8. Obtaining, evaluating, and communicating information.	✔	✔			✔	✔	✔	✔	✔	✔	✔	✔	✔	✔
Mathematics Practices (Common Core)																			**Mathematics Practices (Common Core)**												
M1. Makes sense of problems and persevere in solving them.				✔	✔	✔	✔		✔				✔	✔	✔		✔		M1. Makes sense of problems and persevere in solving them.	✔	✔	✔											
M2. Reason abstractly and quantitatively				✔	✔	✔	✔	✔	✔				✔	✔	✔				M2. Reason abstractly and quantitatively	✔	✔	✔		✔	✔	✔	✔	✔	✔	✔	✔	✔	✔
M3. Construct viable arguments and critique the reasoning of others.			✔														✔		M3. Construct viable arguments and critique the reasoning of others.	✔	✔												
M4. Model with matematics.	✔			✔			✔						✔		✔				M4. Model with matematics.	✔	✔												
M5. Use appropriate tools strategically.	✔			✔	✔		✔				✔	✔							M5. Use appropriate tools strategically.		✔			✔	✔	✔	✔	✔	✔	✔	✔	✔	✔
M6. Attend to precision.				✔		✔	✔		✔		✔	✔		✔					M6. Attend to precision.	✔	✔	✔		✔	✔	✔	✔	✔	✔	✔	✔	✔	✔
M7. Look for and make use of structure.		✔	✔					✔	✔										M7. Look for and make use of structure.		✔	✔											
M8. Look for and express regularity in repeated reasoning.	✔					✔			✔										M8. Look for and express regularity in repeated reasoning.	✔	✔												
English Lanuage Arts Student Capacities (Common Core)																			**English Lanuage Arts Student Capacities (Common Core)**												
E1. They demonstrate independence.		✔				✔	✔		✔		✔	✔							E1. The demonstrate independence.	✔	✔	✔		✔	✔	✔	✔	✔	✔	✔	✔	✔	✔
E2. They build strong content knowledge.		✔	✔	✔		✔	✔		✔			✔							E2. They build strong content knowledge.	✔	✔	✔		✔	✔	✔	✔	✔	✔	✔	✔	✔	✔
E3. They respond to the varing demands of audience, task, purpose, and discipline.			✔																E3. They respond to the varing demands of audience, task, purpose, and discipline.	✔	✔			✔	✔	✔	✔	✔	✔	✔	✔	✔	✔
E4. They comprehend as well as critique.				✔													✔		E4. They comprehend as well as critique.	✔	✔												
E5. They value evidence.				✔			✔												E5. They value evidence.	✔	✔	✔		✔	✔	✔	✔	✔	✔	✔	✔	✔	✔
E6. They use technology and digital media strategically and capably.							✔												E6. They use technology and digital media strategically and capably.	✔	✔	✔											
E7. They come to understand other perspectives and cultures.				✔					✔										E7. They come to understand other perspectives and cultures.														

Crosscutting Concepts	Introductory Learning Activities					Field Learning Activities			Protocols				Data Analysis			Scientific Process		
✔ = *covered directly in activities* ✔ = *addressed, but not directly covered.*	Paper Clip Factory Analogy	Carbon Cycle Adventure Story	Carbon Travels Game	Getting to Know the Global Carbon Cycle	Pencil Carbon Storage	Biomass Units	Allometry: Not A Llama Tree	Percent Cover	How to Measure Trees	Carbon Cycle Site Selection	Carbon Cycle Site Set Up	Tree Shrub and Herbaceous Protocols	Biomass Analysis	Determining Scale & Calculating Area	NPP Analysis	Posing Research Questions	Develop Investigation Plan	Identifying New Research Questions
Grades 6-12																		
Cross Cutting Concepts																		
Patterns	✔		✔	✔			✔	✔	✔	✔		✔						
Cause and Effect: Mechanism and Prediction	✔	✔	✔															
Scale, Proportion, and Quantity	✔			✔	✔	✔	✔	✔	✔					✔				
Systems and Systems Models	✔	✔	✔	✔														
Energy and Matter: Flows, Cycles, and Conservation		✔	✔	✔		✔												
Structure and Function							✔											
Stability and Change	✔		✔	✔											✔			
Science, Technology, Society, and the Environment																		
Interdependence of Science, Engineering, and Technology				✔		✔	✔		✔		✔	✔	✔	✔	✔			
Influence of Engineering, Technology, and Science on Society and the Natural World				✔						✔					✔			

Crosscutting Concepts	Modeling Activities			Plant-A-Plant Classroom Experiments											
✔ = *covered directly in activities* ✔ = *addressed, but not directly covered.*	Biomass Accumulation Model	Global C Cycle Model	Plant Growth Models	Seed Germination	Light Experiment	Mineral Nutrition Experiment	Water Experiment	Carbon Dioxide Experiment	Mineral Nutrition II	Water II	CO2 II	Photosynthesis	Temperature	Soil Respiration
Grades 6-12															
Cross Cutting Concepts															
Patterns	✔	✔	✔												
Cause and Effect: Mechanism and Prediction	✔	✔	✔		✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔
Scale, Proportion, and Quantity	✔	✔	✔		✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔
Systems and Systems Models	✔	✔	✔												
Energy and Matter: Flows, Cycles, and Conservation		✔			✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔
Structure and Function					✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔
Stability and Change	✔	✔	✔												
Science, Technology, Society, and the Environment															
Interdependence of Science, Engineering, and Technology	✔	✔	✔												
Influence of Engineering, Technology, and Science on Society and the Natural World		✔													