THE GREEN TEAM Activities and Lesson Plans Alignment with the Massachusetts Science and Technology/Engineering Curriculum Framework, April 2016

Grade	Strand	Learning Standard	Climate Change Activities	Composting	Light Bulb	Slash Trash	Clean Air/Idling Reduction
PreK	Earth and Space Sciences	**PreK-ESS2-1(MA).** Raise questions and engage in discussions about how different types of local environments (including water) provide homes for different kinds of living things.		X			X
		PreK-ESS2-2(MA). Observe and classify non-living materials, natural and human made, in their local environment.		X		X	
		PreK-ESS2-6(MA). Provide examples of the impact of weather on living things	X				
		PreK-ESS3-1(MA). Engage in discussion and raise questions using examples about local resources (including soil and water) humans use to meet their needs.	X	X		X	
		PreK-ESS3-2(MA). Observe and discuss the impact of people's activities on the local environment.	X	X	X	X	X
PreK	Life Science	**PreK-LS1-3(MA).** Use their five senses in their exploration and play to gather information.		X			
		PreK-LS2-3(MA). Give examples from the local environment of how animals and plants are dependent on one another to meet their basic needs.		X			X
PreK	Physical Sciences	**PreK-PS1-1(MA).** Investigate natural and human-made objects to describe, compare, sort and classify objects based on observable physical characteristics, uses, and whether something is manufactured or occurs in nature.		X		X	
		PreK-PS1-3(MA). Differentiate between the properties of an object and those of the material of which it is made.		X		X	
		PreK-PS1-4(MA). Recognize through investigation that physical objects and materials can change under different circumstances.		X	X	X	
K	Earth and Space Sciences	**K-ESS2-2.** Construct an argument supported by evidence for how plants and animals (including humans) can change the environment.	X	X	X	X	X
		K-ESS3-3. Communicate solutions to reduce the amount of natural resources an individual uses	X		X	X	X
K	Life Science	**K-LS1-2(MA).** Recognize that all plants and animals grown and change over time.		X			
K	Physical Science	**K-PS3-1.** Make observations to determine that sunlight warms materials on Earth's surface.	X				

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K	Physical Science	**K-PS3-2.** Use tools and materials to design and build a model of a structure that will reduce the warming effect of sunlight on an area.	X				
G1	Earth and Space Sciences	**1-ESS1-2.** Analyze provided data to identify relationships among seasonal patterns of change, including relative sunrise and sunset time changes, seasonal temperature and rainfall or snowfall patterns, and seasonal changes to the environment.	X				
G1	Physical Science	**1-PS4-3.** Conduct an investigation to determine the effect of placing materials that allow light to pass through them, allow only some light to pass through them, block all light, or redirect light when put in the beam of light.	X				
G1	Technology / Engineering	**K-2-ETS1-2**. Generate multiple solutions to a design problem and make a drawing (plan) to represent one or more of the solutions.		X		X	X
G2	Earth Systems	**2-ESS2-1.** Investigate and compare the effectiveness of multiple solutions designed to slow or prevent wind or water from changing the shape of the land.	X				
G2	Life Science	**2-LS2-3(MA).** Develop and use models to compare how plants and animals depend on their surroundings and other living things to meet their needs in the places they live.		X			
G2	Physical Science	**2-PS1-1.** Describe and classify different kinds of materials by observable properties of color, flexibility, hardness, texture, and absorbency.		X		X	
		2-PS1-2. Test different materials and analyze the data obtained to determine while materials have the properties that are best suited for an intended purpose.		X		X	
G2	Engineering Design	**2K-2-ETS1-3.** Analyze data from tests of two objects designed to solve the same design problem to compare the strengths and weaknesses of how each object performs.			X		
G3	Earth's Systems	**3-ESS2-2.** Obtain and summarize information about the climate of different regions of the world to illustrate that typical weather conditions over a year vary by region.	X				
G3	Life Science	**3-LS1-1.** Use simple graphical representations to show that different types of organisms have unique and diverse life cycles. Describe that all organisms have birth, growth, reproduction, and death in common but there are a variety of ways in which these happen.		X			

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G3	Life Science	**3-LS4-1.** Use fossils to describe types of organisms and their environments that existed long ago and compare those to living organisms and their environments. Recognize that most kinds of plants and animals that once lived on Earth are no longer found anywhere.	X				X
		3-LS4-4. Analyze and interpret given data about changes in a habitat and describe how the changes may affect the ability of organisms that live in that habitat to survive and reproduce.	X				X
G3	Engineering Design	**3-5-ETS1-1.** Define a simple design problem that reflects a need or a want. Include criteria for success and constraints on materials, time, or cost that a potential solution must meet.		X	X	X	X
		3-5-ETS1-2. Generate several possible solutions to a design problem. Compare each solution based on how well each is likely to meet the criteria and constraints of the design problem.		X	X	X	X
		3-5-ETS1-4(MA). Gather information using various informational resources on possible solutions to a design problem. Present different representations of a design solution.		X	X	X	X
G4	Earth and Space Sciences	**4-ESS3-1.** Obtain information to describe that energy and fuels humans use are derived from natural resources and that some energy and fuel sources are renewable and some are not.	X		X		X
G4	Life Science	**4-LS1-1.** Construct an argument that animals and plants have internal and external structures that support their survival, growth, behavior, and reproduction.		X			
G4	Physical Science	**4-PS3-2.** Make observations to show that energy can be transferred from place to place by sound, light, heat, and electric currents.			X		X
G4	Technology / Engineering	**3-5-ETS1-3.** Plan and carry out tests of one or more design features of a given model or prototype in which variables are controlled and failure points are considered to identify which features need to be improved. Apply the results of tests to redesign a model or prototype.		X		X	X
		3-5-ETS1-5(MA). Evaluate relevant design features that must be considered in building a model or prototype of a solution to a given design problem.		X	X	X	X

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G5	Earth and Space Sciences	**5-ESS2-2.** Describe and graph the relative amounts of salt water in the ocean; fresh water in lakes, rivers, and groundwater; and fresh water frozen in glaciers and polar ice caps to provide evidence about the availability of fresh water in Earth's biosphere.	X				
		5-ESS3-1. Obtain and combine information about ways communities reduce human impact on the Earth's resources and environment by changing an agricultural, industrial, or community practice or process.	X	X	X	X	X
G5	Life Science	**5-LS2-1.** Develop a model to describe the movement of matter among producers, consumers, decomposers, and the air, water and soil in the environment to (a) show that plants produce sugars and plant materials, (b) show that animals can eat plants and/or other animals for food and (c) show that some organisms, including fungi and bacteria, break down dead organisms and recycle some materials back to the air and soil.		X			
		5-LS2-2(MA). Compare at least two designs for a composter to determine which is most likely to encourage decomposition of materials.*		X			
G5	Physical Science	**5-PS1-1.** Use a particle model of matter to explain common phenomena involving gases, and phase changes between gas and liquid and between liquid and solid.	X				
		5-PS1-4. Conduct an experiment to determine whether the mixing of two or more substances results in new substances with new properties (a chemical reaction) or not (a mixture).		X			
		5.3-5-ETS3-1(MA). Use informational text to provide examples of improvements to existing technologies (innovations) and the development of new technologies (inventions). Recognize that technology is any modification of the natural or designed world done to fulfill human needs or wants.			X	X	
		5.3-5-ETS3-2(MA). Use sketches or drawings to show how each part of a product or device relates to other parts in the product or device.			X		
		6.MS-PS1-6. Plan and conduct an experiment involving exothermic and endothermic chemical reactions to measure and describe the release or absorption of thermal energy.	X				
		6.MS-PS4-2. Use diagrams and other models to show that both light rays and mechanical waves are reflected, absorbed, or transmitted through various materials.	X				

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G6	Technology / Engineering	**6.MS-ETS1-1.** Define the criteria and constraints of a design problem with sufficient precision to ensure a successful solution. Include potential impacts on people and the natural environment that may limit possible solutions.	X	X	X	X	X
		6.MS-ETS1-5(MA). Create visual representations of solutions to a design problem. Accurately interpret and apply scale and proportion to visual representations.		X		X	X
		6.MS-ETS1-6(MA). Communicate a design solution to an intended user, including design features and limitations of the solution.		X		X	X
		6.MS-ETS2-2(MA). Given a design task, select appropriate materials based on specific properties needed in the construction of a solution.		X		X	X
G7	Earth and Space Sciences	**7.MS-ESS2-2.** Construct an explanation based on evidence for how Earth's surface has changed over scales that range from local to global in size.	X				
		7.MS-ESS3-4. Construct an argument supported by evidence that human activities and technologies can mitigate the impact of increases in human population and per capita consumption of natural resources on the environment.	X	X	X	X	X
G7	Life Science	**7.MS-LS1-4.** Construct an explanation based on evidence for how characteristic animal behaviors and specialized plant structures increase the probability of successful reproduction of animals and plants.		X			
		7.MS-LS2-1. Analyze and interpret data to provide evidence for the effects of periods of abundant and scarce resources on the growth of organisms and the size of populations in an ecosystem.		X			
		7.MS-LS2-2. Describe how relationships among and between organisms in an ecosystem can be competitive, predatory, parasitic, and mutually beneficial and that these interactions are found across multiple ecosystems.		X			
		7.MS-LS2-3. Develop a model to describe that matter and energy are transferred among living and nonliving parts of an ecosystem and that both matter and energy are conserved through these processes.		X			
		7.MS-LS2-4. Analyze data to provide evidence that disruptions (natural or human-made) to any physical or biological component of an ecosystem can lead to shifts in all its populations.	X				

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G7	Life Science	**7.MS-LS2-5.** Evaluate competing design solutions for protecting an ecosystem. Discuss benefits and limitations of each design.	X				
		7.MS-LS2-6(MA). Explain how changes to the biodiversity of an ecosystem—the variety of species found in the ecosystem—may limit the availability of resources humans use.	X			X	
G7	Physical Science	**7.MS-PS3-4.** Conduct an investigation to determine the relationships among the energy transferred, how well the type of matter retains or radiates heat, the mass, and the change in the average kinetic energy of the particles as measured by the temperature of the sample.			X		
		7.MS-PS3-6(MA). Use a model to explain how thermal energy is transferred out of hotter regions or objects and into colder ones by convection, conduction, and radiation.			X		
G7	Technology / Engineering	**7.MS-ETS1-4.** Generate and analyze data from iterative testing and modification of a proposed object, tool, or process to optimize the object, tool, or process for its intended purpose.		X			X
		7.MS-ETS1-7(MA). Construct a prototype of a solution to a given design problem.		X		X	X
		7.MS-ETS3-3(MA). Research and communicate information about how transportation systems are designed to move people and goods using a variety of vehicles and devices. Identify and describe subsystems of a transportation vehicle, including structural, propulsion, guidance, suspension, and control subsystems.	X				X
		7.MS-ETS3-4(MA). Show how the components of a structural system work together to serve a structural function. Provide examples of physical structures and relate their design to their intended use.					X
G8	Earth and Space Sciences	**8.MS-ESS2-6.** Describe how interactions involving the ocean affect weather and climate on a regional scale, including the influence of the ocean temperature as mediated by energy input from the Sun and energy loss due to evaporation or redistribution via ocean currents.	X				
		8.MS-ESS3-1. Analyze and interpret data to explain that the Earth's mineral and fossil fuel resources are unevenly distributed as a result of geologic processes.	X				

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G8	Earth and Space Sciences	**8.MS-ESS3-5.** Examine and interpret data to describe the role that human activities have played in causing the rise in global temperatures over the past century.	X	X	X	X	X
G8	Life Science	**8.MS-LS1-5.** Construct an argument based on evidence for how environmental and genetic factors influence the growth of organisms.		X			
G8	Physical Science	**8.MS-PS1-1.** Develop a model to describe that (a) atoms combine in a multitude of ways to produce pure substances which make up all of the living and nonliving things that we encounter, (b) atoms form molecules and compounds that range in size from two to thousands of atoms, and (c) mixtures are composed of different proportions of pure substances.		X			
		8.MS-PS1-2. Analyze and interpret data on the properties of substances before and after the substances interact to determine if a chemical reaction has occurred.		X			X
HS	Earth and Space Sciences	**HS-ESS2-2.** Analyze geoscience data to make the claim that one change to Earth's hydrosphere can create feedbacks that cause changes to other Earth systems.	X				
		HS-ESS2-4. Use a model to describe how variations in the flow of energy into and out of Earth's systems over different time scales result in changes in climate. Analyze and interpret data to explain that long-term changes in Earth's tilt and orbit result in cycles of climate change such as Ice Ages.	X				
		HS-ESS2-6. Use a model to describe cycling of carbon through the ocean, atmosphere, soil, and biosphere and how increases in carbon dioxide concentrations due to human activity have resulted in atmospheric and climate changes.	X	X	X	X	X
		HS-ESS3-1. Construct an explanation based on evidence for how the availability of key natural resources and changes due to variations in climate have influenced human activity.	X				
		HS-ESS3-2. Evaluate competing design solutions for minimizing impacts of developing and using energy and mineral resources, and conserving and recycling those resources, based on economic, social and environmental cost-benefit ratios.	X	X	X	X	X
		HS-ESS3-3. Illustrate relationships among management of natural resources, the sustainability of human populations, and biodiversity.	X			X	

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HS	Earth and Space Sciences	**HS-ESS3-5.** Analyze results from global climate models to describe how forecasts are made of the current rate of global or regional climate change and associated future impacts to Earth systems.	X				
HS	Biology	**HS-LS1-7.** Use a model to illustrate that aerobic cellular respiration is a chemical process whereby the bonds of food molecules and oxygen molecules are broken and new bonds form, resulting in new compounds and a net transfer of energy.		X			
		HS-LS2-1. Analyze data sets to support explanations that biotic and abiotic factors affect ecosystem carrying capacity.	X				
		HS-LS2-2. Use mathematical representations to support explanations that biotic and abiotic factors affect biodiversity, including genetic diversity within a population and species diversity within an ecosystem.	X	X			
		HS-LS2-4. Use a mathematical model to describe the transfer of energy from one trophic level to another. Explain how the inefficiency of energy transfer between trophic levels affects the relative number of organisms that can be supported at each trophic level and necessitates a constant input of energy from sunlight or inorganic compounds from the environment.		X			
		HS-LS2-5. Use a model that illustrates the roles of photosynthesis, cellular respiration, decomposition, and combustion to explain the cycling of carbon in its various forms among the biosphere, atmosphere, hydrosphere, and geosphere.	X	X		X	X
		HS-LS2-6. Analyze data to show ecosystems tend to maintain relatively consistent numbers and types of organisms even when small changes in conditions occur but that extreme fluctuations in conditions may result in a new ecosystem. Construct an argument supported by evidence that ecosystems with greater biodiversity tend to have greater resistance to change and resilience.	X	X			
		HS-LS2-7. Analyze direct and indirect effects of human activities on biodiversity and ecosystem health, specifically habitat fragmentation, introduction of non-native or invasive species, overharvesting, pollution, and climate change. Evaluate and refine a solution for reducing the impacts of human activities on biodiversity and ecosystem health.	X	X	X	X	X

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HS	Physics	**HS-PS3-3.** Design and evaluate a device that works within given constraints to convert one form of energy into another form of energy.	X				X
		HS-PS4-5. Communicate technical information about how some technological devices use the principles of wave behavior and wave interactions with matter to transmit and capture information and energy.					X
HS	Technology / Engineering	**HS-ETS1-1.** Analyze a major global challenge to specify a design problem that can be improved. Determine necessary qualitative and quantitative criteria and constraints for solutions, including any requirements set by society.	X	X	X	X	X
		HS-ETS1-2. Break a complex real-world problem into smaller, more manageable problems that each can be solved using scientific and engineering principles.	X	X	X	X	X
		HS-ETS1-3. Evaluate a solution to a complex real-world problem based on prioritized criteria and trade-offs that account for a range of constraints, including cost, safety, reliability, aesthetics, and maintenance, as well as social, cultural, and environmental impacts.	X	X	X	X	X
		HS-ETS1-5(MA). Plan a prototype or design solution using orthographic projections and isometric drawings, using proper scales and proportions.					X
		HS-ETS1-6(MA). Document and present solutions that include specifications, performance results, successes and remaining issues, and limitations.					X
		HS-ETS1-6(MA). Document and present solutions that include specifications, performance results, successes and remaining issues, and limitations.	X	X	X	X	X
		HS-ETS4-1(MA). Research and describe various ways that humans use energy and power systems to harness resources to accomplish tasks effectively and efficiently.	X		X		X