



NGSS – COMPOST – ALL GRADES

Lesson Name	Grade Level
Compost	K

NGSS Standard (performance expectation)	Related Lesson Activities
<p><u>K-LS1-1: Use observations to describe patterns of what plants and animals (including humans) need to survive.</u></p>	<ul style="list-style-type: none"> - Bugs, worms, and things too small to see (Garden FBI) need air, water, and food to live just like people
<p><u>K-ESS2-2: Construct an argument supported by evidence for how plants and animals (including humans) can change the environment to meet their needs.</u></p>	<ul style="list-style-type: none"> - Bugs, worms, and things too small to see (Garden FBI) change the materials in the compost by eating and digesting them, making healthier soil for creatures living in the soil
<p><u>K-ESS3-3: Communicate solutions that will reduce the impact of humans on the land, water, air, and/or other living things in the local environment.</u></p>	<ul style="list-style-type: none"> - Discussion of human impacts of Global Climate Change, described as the Earth having a fever - Compost is posed as part of the solution, along with solutions discussed and reviewed from the prior 2 lessons.
<p><u>K-2-ETS1-1: Ask questions, make observations, and gather information about a situation people want to change to define a simple problem that can be solved through the development of a new or improved object or tool.</u></p>	<ul style="list-style-type: none"> - Composting as a tool for reducing impacts of climate change, creating healthier soil, and for not wasting nutrients - Students can develop the tool but making their own compost bins at home and seeing what works about the bin, and what doesn't

Lesson Name**Grade Level**

Compost	1st
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NGSS Standard (performance expectation)**Related Lesson Activities**

<u>K-2-ETS1-1: Ask questions, make observations, and gather information about a situation people want to change to define a simple problem that can be solved through the development of a new or improved object or tool.</u>	<ul style="list-style-type: none">- Composting as a tool for reducing impacts of climate change, creating healthier soil, and for not wasting nutrients- Students can develop the tool but making their own compost bins at home and seeing what works about the bin, and what doesn't
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Lesson Name**Grade Level**

Compost	2nd
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NGSS Standard (performance expectation)**Related Lesson Activities**

<u>2-PS1-1: Plan and conduct an investigation to describe and classify different kinds of materials by their observable properties.</u>	<ul style="list-style-type: none"> - Discussion of food sources that are compostable and not compostable based off observable properties such as organic vs inorganic, and surface area
<u>2-PS1-2: Analyze data obtained from testing different materials to determine which materials have the properties that are best suited for an intended purpose. Examples of properties could include, strength, flexibility, hardness, texture, and absorbency.</u>	<ul style="list-style-type: none"> - Discussion of properties of compostable material (organic vs inorganic)
<u>2-PS1-3: Make observations to construct an evidence-based account of how an object made of a small set of pieces can be disassembled and made into a new object.</u>	<ul style="list-style-type: none"> - Compost is a rebuilding of food scraps into something new - Small pieces may be visible or not in final product
<u>2-ESS1-1: Use information from several sources to provide evidence that Earth events can occur quickly or slowly. Examples of events and timescales could include volcanic explosions and earthquakes, which happen quickly and erosion of rocks, which occurs slowly.</u>	<ul style="list-style-type: none"> - Discussion of the timescales of breakdown for compostable items vs non-compostable items - Discussion of the time for compost bins vs landfill to break our food down
<u>K-2-ETS1-1: Ask questions, make observations, and gather information about a situation people want to change to define a simple problem that can be solved through the development of a new or improved object or tool.</u>	<ul style="list-style-type: none"> - Composting as a tool for reducing impacts of climate change, creating healthier soil, and for not wasting nutrients - Students can develop the tool but making their own compost bins at home and seeing what works about the bin, and what doesn't

Lesson Name**Grade Level**

Compost	3rd
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NGSS Standard (performance expectation)**Related Lesson Activities**

<p><u>3-LS1-1: Develop models to describe that organisms have unique and diverse life cycles but all have in common birth, growth, reproduction, and death</u></p>	<ul style="list-style-type: none"> - Overview of the decomposition cycle with poster - Drawing their own decomposition models (remote) - Description of life cycles of organisms within the decomposition cycle including invertebrates, microorganisms, and plants
<p><u>3-LS4-3: Construct an argument with evidence that in a particular habitat some organisms can survive well, some survive less well, and some cannot survive at all</u></p>	<ul style="list-style-type: none"> - Explanation of what types of foods can go into the compost and why certain foods are not good for the organisms (aka they can't survive) - Discussion about climate change (why organisms in compost cannot survive in a landfill, but anaerobic organisms can)
<p><u>3-LS4-4: Make a claim about the merit of a solution to a problem caused when the environment changes and the types of plants and animals that live there may change</u> *cannot include climate change</p>	<ul style="list-style-type: none"> - Composting is a solution to creating healthier, stronger plants in unhealthy soils - Compost helps soil retain moisture, important for drying climate
<p><u>3-LS3-2: Use evidence to support the explanation that traits can be influenced by the environment</u></p>	<ul style="list-style-type: none"> - Slide showing experiment of plants growing with different amount of compost, compost/presence of more nutrients in the soil influences plant growth and number/health of fruits
<p><u>3-5-ETS1-2: Generate and compare multiple possible solutions to a problem based on how well each is likely to meet the criteria and constraints of the problem</u></p>	<ul style="list-style-type: none"> - Composting is a solution to reducing food waste and reducing methane gas from landfills - Composting can produce healthier, more productive gardens

Lesson Name**Grade Level**

Compost	4th
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NGSS Standard (performance expectation)**Related Lesson Activities**

<u>4-LS1-1: Construct an argument that plants and animals have internal and external structures that function to support survival, growth, behavior, and reproduction</u>	<ul style="list-style-type: none">- Description of worms and the function of the slime on the skin, their stomach grinder for breaking down the organic matter, and other facts about their structures (general worm facts)- Function of exoskeleton for some invertebrates
<u>3-5-ETS1-2: Generate and compare multiple possible solutions to a problem based on how well each is likely to meet the criteria and constraints of the problem</u>	<ul style="list-style-type: none">- Composting is a solution to reducing food waste and reducing methane gas from landfills- Composting can produce healthier, more productive gardens

Lesson Name**Grade Level**

Compost	5th
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NGSS Standard (performance expectation)**Related Lesson Activities**

<u>5-LS2-1: Develop a model to describe the movement of matter among plants, animals, decomposers, and the environment</u>	<ul style="list-style-type: none">- Decomposition cycle poster explanation and creation of their own poster- Explanation of role of decomposers and how they relate to plants- Discussion of nutrient cycling
<u>5-ESS3-1: Obtain and combine information about ways individual communities use science ideas to protect the Earth's resources and environment</u>	<ul style="list-style-type: none">- Composting is a way to protect the environment and conserve natural resources by keeping food out of the landfill that would contribute to methane gas, people can do it on an individual level- Description of how each school composts, how the student's families compost, etc.
<u>3-5-ETS1-2: Generate and compare multiple possible solutions to a problem based on how well each is likely to meet the criteria and constraints of the problem</u>	<ul style="list-style-type: none">- Composting is a solution to reducing food waste and reducing methane gas from landfills- Composting can produce healthier, more productive gardens

Lesson Name**Grade Level**

Compost	6th
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NGSS Standard (performance expectation)**Related Lesson Activities**

<u>MS-LS1-5: Construct a scientific explanation based on evidence for how environmental and genetic factors influence the growth of organisms</u>	<ul style="list-style-type: none"> - Discussion of experiment with varying amounts of compost in the soil - Discussion of nutrient recycling and how it affects plant growth - Discussion of what conditions decomposers are happiest in
<u>MS-LS2-1: Analyze and interpret data to provide evidence for the effects of resource availability on organisms and populations of organisms in an ecosystem.</u>	<ul style="list-style-type: none"> - Discussion of nutrient recycling and how it affects plant growth, reproductive capability, and population size - Discussion of the role of compost in nutrient recycling
<u>MS-LS2-3: Develop a model to describe the cycling of matter and flow of energy among living and nonliving parts of the ecosystem</u>	<ul style="list-style-type: none"> - Decomposition cycle poster activity - Discussion of nutrient recycling - Discussion of each part of the cycle and how microorganisms and invertebrates play a role as decomposers in an ecosystem
<u>MS-ESS3-3: Apply scientific principles to design a method for monitoring and minimizing a human impact on the environment</u>	<ul style="list-style-type: none"> - Identifying the problem of waste and impacts on the environment - Assessing different solutions humans have tried to use, like landfills - Discussion of how composting is a solution to reducing food waste, ensuring food waste in the landfill doesn't add to the methane gas in the atmosphere, and minimizes human impact on environment
<u>MS-LS1-6: Construct a scientific explanation based on evidence for the role of photosynthesis in the cycling of matter and flow of energy into and out of organisms</u>	<ul style="list-style-type: none"> - Discussion of what plants need to grow, decomposition cycle poster flow of energy
<u>MS-LS2-4: Construct an argument supported by empirical evidence that changes to physical or biological components of an ecosystem affect populations</u>	<ul style="list-style-type: none"> - Discussion of what food should and shouldn't go into the compost - Image and discussion of experiment with varying amounts of compost in the soil showing plant growth

<p><u>MS-LS2-5: Evaluate competing design solutions for maintaining biodiversity and ecosystem services</u></p>	<ul style="list-style-type: none">- Within the solution of composting, there are many ways to designing a composting system (yellow bin, heat composting, vermicomposting)- Discussing landfill vs. composting food
<p><u>MS-ESS3-5: Ask questions to clarify evidence of the factors that have caused the rise in global temperatures over the past century</u></p>	<ul style="list-style-type: none">- Discussion of climate change and how food waste contributes to methane gas production in landfills