Island Grown Schools Soil Unit

Unit Title: **Soil/Compost/Worms** **Grade:** **K-5**

Essential Questions: **Where does soil come from? / What is waste? / How do humans and plants affect each other?**

Connections to IGS Enduring Understandings:	**Knowledge:**
1. Appreciate the farming profession **2.** Recognize the difference between the industrial and local food systems **3.** Understand the connection between healthy soil, healthy plants, and healthy people **4.** Know that everyone can grow food **5.** Feel confident in making healthy food choices	Unit Enduring Understandings: **1.** Composting is a process that can happen in a variety of ways **2.** "Waste" is a valuable resource, ("there is no such thing as waste, until it is wasted") **3.** Creating healthy soil means creating healthy people **4.** Worms are one of the most valuable creatures on the planet Students will know: **1.** The definition of "compost" **2.** Why it is important to compost **3.** The four key components of a compost pile **4.** What worms need to survive and thrive **5.** How worms turn waste into "black gold"
Connections to MA Frameworks/Common Core:	**Skills:**
Science: PreK-2 Earth and Space (ES) and Life Science (LS), including: ES 1. Recognize that water, rocks, soil, and living organisms are found on the earth's surface. LS 1. Recognize that animals (including humans) and plants are living things that grow, reproduce, and need food, air, and water. LS 3. Recognize that plants and animals have life cycles, and that life cycles vary for different living things. LS 4. Describe ways in which many plants and animals closely	Students will be able to: **A.** Create and maintain a compost and/or vermicompost system **B.** Identify a healthy compost pile **C.** Identify different types of worms **D.** Recognize healthy soil (through the presence of worms) **E.** Harvest finished compost and/or worm castings **F.** Grow plants in the garden/greenhouse using compost/vermicompost **G.** Explain to others the importance of composting

resemble their parents in observed appearance. LS 7. Recognize changes in appearance that animals and plants go through as the seasons change. LS 8. Identify the ways in which an organism's habitat provides for its basic needs (plants require air, water, nutrients, and light; animals require food, water, air, and shelter). Science: 3-5 ES and LS, including: ES 4. Explain and give examples of the ways in which soil is formed. ES 5. Recognize and discuss the different properties of soil. LS 3. Recognize that plants and animals go through predictable life cycles that include birth, growth, development, reproduction, and death. LS 8. Describe how organisms meet some of their needs in an environment by using behaviors (patterns of activities) in response to information (stimuli) received from the environment. LS 11. Describe how energy derived from the sun is used by plants to produce sugars and is transferred within a food chain from producers to consumers to decomposers. Math (M) : Counting and Cardinality (CC); Measurement and Data (MD); Operations and Algebraic Thinking (OA); Fractions (F). Language Arts (LA): fiction, nonfiction, types of writing	

Evidence

Performance Tasks(s): *Specific activities we create for students, to engage in learning concepts...*	Evaluative Criteria
**Worm biographies/autobiographies* **Individual worm bins* **Journalling* **School compost bins* **Soil experiment* **Family worm night*	*Students research worms - their needs, likes, dislikes, lifestyle - and introduce each other to their worms through writing *Students collect appropriate food scraps from school cafeteria and provide sufficient habitat for worm * Students track observations of worm bins in their journals, and compile "I Wonder" questions regarding worms, soil, compost *Students apply appropriate moisture and air to compost pile, and regulate heat in pile for effective composting *Students recognize the difference between sand, peat, and compost through observations of an experiment growing bean plants in different mediums * Students are able to effectively communicate how to build and manage a worm bin, and why it is important
Non-activity based evidence: *Educators will be able to assess student learning by...* ** Students exploring the soil and compost in the school garden (during class time, or during recess)* ** Students contributing their food waste to the compost and/or worm bin* ** Discussions regarding worms, soil, compost* **Interest/involvement in home composting* ** Questions students pose regarding worms, soil, compost* **Changes in behavior, food choices based on questions of "waste"*	

Learning Plan

Code (link to IGS Enduring Understandings, Standards)	Learning Events: *Specific steps students will take in this unit, with or without IGS coordinator, in chronological order*	Notes to support learning event success:
IGS EU 3 ES 4, 5 IGS EU 1 F IGS EU 3 ES 1 LS 1, 3, 4, 7, 8, 11 LS 1, 3, 4 MD IGS EU 3,4 LS 7; LA IGS EU 3 LS 11 IGS EU 1 MD, F, CC LS IGS EU 4 LS 8, 11 MD, F, CC IGS EU 4 LS 8 IGS EU 1,3 LS 1, 3, 4, 7, 8, 11	** "What is soil?" and "Where does soil come from?" Discussions in class.* ** "Why is it important to build soil?" Use the Apple as the Earth activity.* ** "How do we make soil?" Students look for worms in the school garden, collect worms, and create small worm bins in recycled tennis ball containers with food waste from the school cafeteria* ** Students observe and weigh individual worm bins every week for 8 weeks* ** Students write worm biographies/autobiographies* ** Students collect kitchen scraps from the school cafeteria and add materials to bin to start school worm compost system* **Students explore large-scale composting through the creation/maintenance of the school compost bins* ** Students compare soil through an experiment growing beans in different types of soil* ** Students start seeds in the greenhouse using their own compost* ** Students create their own worm bins to manage the waste in their household* **Students teach their parents and family members how to build a worm bin, how to harvest worm castings, and the importance of worms in creating soil*	* Use soil composition pie chart to clarify the difference between soil, subsoil, compost, and dirt * Students are able to correctly identify worms, and notice differences between earthworms and red wigglers * Students work collaboratively to make sure worms have essentials to survive * From *Worms Eat Our Garbage* * This can transform into a year-long class responsibility to take on the school compost system (3rd, 4th, and 5th grade) * Discuss 4 components of compost: Nitrogen/green material; Carbon/brown material; Oxygen/air; Water * See IGS Seed Curriculum for more details * Also discuss various composting options (outdoor bins, tumbler, etc.)

IGS EU 1,3,4 IGS EU 5 IGS EU 1, 2, 3 LS 1, 3, 4, 7, 8, 11	**Students create "Zero Waste" meals* ***FARM FIELD TRIPS*** - *Allen Farm, Chilmark: compost tea* - *Native Earth Teaching Farm: compost pile* - *Morning Glory Farm, Edgartown: large-scale compost system*	* From Growing Greener Schools, Part 4: Composting * Allen Farm compost tea brews from April-October

Materials	Resources
Recycled items to use as worm bins: - tennis ball containers (for individual worm bins) - circular fish bins (for family worm bins) - plastic storage containers (for family/school worm bins) For worm bins: hardware cloth shredded paper water in spray bottles drill For school compost bin: wood pallets (http://www.livingoffgrid.org/used-wooden-pallets-or-skids-making-free-easy-compost-bins/) *or* compost tumbler (http://www.thecomposttumbler.com/composting/composting-and-compost-tumblers) *or* chicken wire (http://cobcottagegifts.com/tag/bin-composting/) **SONGS** Dirt made my Lunch (http://www.youtube.com/watch?v=SCeyXW64cns)	**Books:** Worms Eat Our Garbage; Worms eat My Garbage, by Mary Appelhof Project Seasons, Shelburne Farms PeeWee books, by Larraine Roulston The Worm Cafe: Mid-scale Vermicomposting of Lunchroom Wastes, by Binet Paine **Articles/Curriculum:** (on google docs) Mary Russell: "From trash to treasure" curriculum Aimee Ostenson: Soil! unit Growing Greener Schools, Part 4: Composting **Community resource people:** Simon Athearn, Morning Glory Farm Mitchell Posin, Allen Farm **Websites:** Vermi the worm: http://www.calrecycle.ca.gov/vermi/ Great "How to" composting website: http://extension.missouri.edu/publications/DisplayPub.aspx?P=G6957 Worm Woman: http://www.wormwoman.com/ **Movies:** DIRT! The movie (http://www.hulu.com/watch/191666/dirt-the-movie) **Other involved organizations:** MV Compost