Curricular Unit: Dig it! Composting Analysis with Temperature Sensors

Contributed by: Kansas State University, Computing and Information Systems Department, National Science Foundation GK12 INSIGHT Program

Prepared for http://www.teachengineering.org/

***Grade:** 6 (5-7)

Time Required

Please see individual lessons and activities. Generally, the unit can span much of the school year with composting starting in the Fall and analysis and evaluation continuing in the Spring.

*Summary

This sustainability unit focuses on composting analysis as a way to introduce a variety of science, math, ecology and biology lessons and activities. Students evaluate several composting designs and determine which design is most effective. Students get to work with sensors, data loggers, and measuring devices during the analysis and conduct a variety of engineering-related analysis skills such as data gathering, filtering and graphical analysis. Along the way, several lessons and activities related to worms are also introduced.

*Engineering Connection

Engineers help address sustainability issues and work in a variety of ways to support the three Rs+C: Reduce, Reuse, Recycle and Composting. Engineers are crucial to designing waste reduction and waste management systems that are as effective, efficient, and cost-effective as possible. Comprehensive waste management systems are likely to include composting as a way to take our biodegradable kitchen and plant waste and turn it into useful products such as natural fertilizer. From selecting and applying technologies to determining the optimum characteristics of any particular technique, engineers can help us implement composting on an individual, school or community-wide scale.

Engineering Category

1. Relating science and/or math concepts to engineering
2. Engineering analysis or partial design
3. Engineering design process

*Subject Area(s)

Life Science
Science and Technology
Biology

***Keywords:** sustainability, recycle, reuse, compost, compost bins, science, ecology, environment, trash, waste management, waste reduction, biodegrade, worms.

Educational Standards

Shawnee School District Grade 6 (2010) from Kansas Science Standards -

- Objective 4006.01 - Identify a problem statement that can be answered through science investigation.
- Objective 4006.02 - Design and conduct investigations safely using appropriate tools, mathematics, technology, and techniques to gather, analyze and interpret data.
- Objective 4006.03 - Identify relationships between evidence and logical conclusions.
- Objective 4006.08 - Understand that internal and/or environmental conditions affect an organism's behavior and/or response in order to maintain and regulate stable internal conditions to survive in a continually changing environment.
- Objective 4006.15 - Recognize that all populations living together (biotic resources) and the physical factors (abiotic factors) with which they interact compose an ecosystem.
- Objective 4006.35 - Trace the energy flow from the sun (source of radiant energy) to producers (via photosynthesis – chemical energy) to consumers and decomposers in food webs.

*Related Lessons

- Compost Design
- Creepy Crawlers - Worm Biology (or Worms in Sustainability?)
- Gathering Data

*Related Activities

- Hands On Activity: How Fast Can A Carrot Rot?
- Designing Composting Alternatives (Setting them up, deciding what a "good" system needs to do - what makes it good, how will they be graded, making informed hypotheses)
- Kicking off the Composting Design Experiment (understanding data analysis and scientific evaluation, gathering remote data, understanding data issues)

- Evaluating Composting Alternatives (Gathering data, managing many variables, looking at what effects it, assessing the data to determine the "best designs")
- Hands on Worms (Do they prefer wet or dry?)

Unit Overview **(Return to Contents)**
Overview of topics: (1)

Unit Schedule
See individual lessons and activities.

Summary Assessment
To evaluate the effectiveness of this unit, a pre-test is available that can be administered prior to beginning any of the activities or lessons. The same test can be taken as a post-test, after completion of the unit activities and lessons, and the results compared to assess the learning progress.

Attachments

Other

Redirect URL

Contributors
Denise Case, Kansas State University, Lucas Shivers and Lindsey Burch, Bluejacket Flint Elementary.

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*Supporting Program
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