

**Unit title:** How to build a working on-site school compost system.

**Teacher name:** Gretchen Czaja

**Grade level:** 4-6 (Average size class or small selected enrichment group)

**Length of Unit** (days/periods): 5-7 45 minute class, plus extra time for final design and construction.

**Timeline:** 6 -8 weeks- time depends on the construction timeline as well.

**Goals of this unit:**

- Design and construct a working on-site school compost system
- Learn the complete food cycle through the life of a carrot
- Learn why compost is an important part of conserving our environment
- Learn what components make up an effective compost system

**Key concepts:** measuring, interest in food and food production, transferring energy, decomposition, sustainability, construction, data collection

**NGSS Cross Cutting Concept (Grades 3-5)-Stability & Change-**For both designed and natural systems that affect stability and factors that control rates of change are critical elements to consider and understand.

- Change is measured in terms of differences over time and may occur different rates.
- Some systems appear stable, but over long periods of time will eventually change.

**Unit Essential Question:**

1. What is the process of composting and why should we compost food waste in order conserve our environment?
2. What is the complete food cycle? How does decomposition occur and what is the correct balance that allows food to decompose essentially turning back into soil?
3. How many people in our school have some type of composting system at their house? What are our local resources we could use to learn more about composting? Are there any local composting models we can visit to get ideas that we use to help us create our school's new compost system?
4. What will be the most effective design for our school's new compost system based on the data you have collected?

5. How can you educate our school community about the importance of composting? How can you help ensure food waste is being sorted into the correct containers in our cafeteria?

## Day 1

**Essential Question:** What is the process of composting and why should we compost food waste in order conserve our environment?

### **Materials:**

- Large Chart Paper
- Markers
- Pencils
- Stickie Notes

Students will engage in a conversation using an informal assessment called the K-W chart (*What they know and what they want to know*). Use the example below to create this chart on large chart paper. (*If you have access to technology, this can be an activity that is done on a Smart Board.*) Have students write 1-2 things they know about composting on a stickie note and 1-2 things they want to learn on other stickie notes. After about 5 minutes, have them start putting their stickie notes on the large chart paper under the correct titles. Essentially discuss the process of decomposition, what it is and why it is beneficial to helping conserve our environment. After all the notes are placed in the chart, review what the notes say. This helps check for student knowledge and helps frame the unit as you move forward.

What do you know about composting?	What do you want to know about composting?

## Day 2

**Essential Question:** What is the complete food cycle? How does decomposition occur and what is the correct balance that allows food to decompose essentially turning back into soil?

### **Materials:**

- Science Notebooks-There are many different types of science journals, composition notebooks work well.
- 1 large glass jar or see through vessel to build compost model.
- Carbon matter (dry leaves, napkins)
- Organic matter (grass, weeds, green leaves)
- One small carrot stick
- Slice of apple
- Compost Fact Sheet (create this ahead of time to make sure you have the correct facts during student discussion)
- Carrot seeds
- Potting soil
- Planting tray or flower pots

### *Creating a Model*

Students will create a jar model of a compost system in order to see how the process of composting actually works. Through out this unit students will see the process of decomposition taking place and observe change over time. They will be able to make and record observations in their notebooks. They will also be able to make adjustments as the days go on because the compost will need adjusting as decomposition (change) happens.

### *Demonstrating the food life cycle*

Use the carrot as an example to demonstrate the complete food cycle from seed to soil. Diagrams are good for showing this cycle. Place a carrot stick and/or apple slice in the compost jar. This will be a way to show the how food decomposes and how change happens over time.

### *Planting the seeds*

Find a way to demonstrate the carrot seeds growing. Use space in your school garden or use flowerpots on windowsills. Have students plant carrot seeds. As they watch the carrots start to grow, they are also watching the carrot stick decompose in the jar. All these changes happening over time should be recorded in their science notebooks.

### *Compost Facts*

Today is also the start of learning how to record information in the science notebooks. Students will start learning how to number pages and use titles to signify the ideas on the page. Begin collecting compost facts so that students are clear about the

actually process is and what will be an effective way to get food waste to decompose. Student will dedicate a section of their science notebooks to design ideas.

### **Day 3**

**Essential Question:** How many people in our school have some type of composting system at their house? What are our local resources we could use to learn more about composting? Are there any local composting models we can visit to get ideas that we use to help us create our school's new compost system?

#### **Materials:**

- Science Notebooks
- Pencils
- Computer to type the survey questions

#### *Create a questionnaire to collect data*

Collecting data helps determine what the school community understands about composting. Create a specific questionnaire designed for the school to determine the broader knowledge of composting. Being able to analyze the data can help move projects forward. Once the questionnaire is designed, determine what the best way to distribute school community what will be the most effective way to get a high percentage of returns and how you will present the data once it is collected. Should it be online? Should it be a paper copy?

#### *Meeting with local compost experts*

Plan a fieldtrip to meet with Jed Dickenson of Vermont Compost Company-ideally this would be a fieldtrip to learn how a large -scale compost system works but also to hear another perspective on composted from a field specialist.

Plan a field trip to meet with WUHS students and Kat Robbins (Locally Grown class) for learn about the large on site system the HS built.

### **Day 4**

**Essential Question:** What will be the most effective design for our school's new compost system based on the data you have collected?

#### **Materials:**

- Modeling clay
- Popsicle sticks
- Glue
- Ribbon
- Other model building materials

Students will begin to use all the data and facts they have collected to design and build a small -scale model of the compost system.

## **Day 5**

**Essential Question:** How can you educate our school community about the importance of composting? How can you help ensure food waste is being sorted into the correct containers in our cafeteria?

### **Materials:**

- A video recording device (iPad, video camera, flip camera)
- Large chart paper
- Markers
- Props and costumes

Using all the information the students have learned and using the facts about composting, have them create an advocacy video or commercial that will help their fellow schoolmates and greater school community learn about composting. Create a script on large chart paper, use props and costumes. Find a way for the whole school to see it.

## **Day 6,7,8**

The rest of the days are spent finalizing the design, contacting community members and parents to help during the build days, ordering the supplies and then actually building the compost itself. Make sure you get approval from your principal and follow any fire or building codes/regulations in your area.

### **Assessments of learning:**

- Review of science notebooks and documented observations-documentation of “change over time” using the compost in a jar model
- Final assessment reflection
- Creation of advocacy video/commercial

### **Final Reflection**

Name one reason why we should compost food waste.

Name two components needed to help food decompose in a compost system.

What did you like most about this project?

**Supporting resources** (websites, book titles, videos, human resources, etc.)

NGSS Science Standards and Frameworks

Vermont Compost Company Website <http://vermontcompost.com/>

Jed Dickenson-Woodstock Compost-local compost expert

Kat Robbins-MBRHNP Place Based Education Teacher and compost leader at Woodstock Union HS/MS

Vermont's Universal Recycling Laws (Act 148)  
<http://www.anr.state.vt.us/dec/wastediv/solid/act148.htm>

Keeley, P. (2008). *Science. Formative Assessments. 75 Practical Strategies for Linking Assessment, Instruction and Learning*. Thousand Oaks, CA: Corwin Press.

Christopher, Thomas, and Marty Asher. *Compost this Book!: The Art of Composting for Your Yard, Your Community and the Planet*. San Francisco: Sierra Club, 1994. Print.