

Where Does it End?

Name: Deb Erhart

Grade Level: Grade 3 – 5

Content area(s): Science, Fine Arts

Classroom Time: 90 minutes plus more time is needed to complete the experiment

Purpose: To study properties in matter through the study of decomposition and how it relates to the environment. Incorporate music into the lesson to assist in the understanding of the material studied.

Skills Addressed:

Science: Scientific inquiry, properties of matter

Visual Arts: Musical style, expression, create or compose, and performance

Supplies:

Handout, pen/pencils, Internet access, 1 container per group (water bottles with the tops cut off, etc), soil, water, at least two pieces of food per group (lettuce, spinach, bread, banana, banana peel, etc), eggshells, foil, plastic, water, paper, and ruler

Lesson Process:

Warm-up –

- A. Ask students what decompose means. – *To rot, to break up into parts, etc.*
- B. Put students in groups of 2 or 3.
- C. Distribute *How Long?* to each group. – Attachment 1
- D. Play [Down to Earth - Peter Gabriel](#) (link to music) while the students complete *How Long?*.
- E. Ask students the following questions:
 - What is needed for items to decompose? – *Moisture, oxygen and sunlight*
 - Why do you think it takes so long for something to decompose? – *Answers will vary: too much trash in one spot, not enough of the elements, etc.*
 - Which item do you think decomposes the quickest? Why? – *Bananas are considered dead since they are removed from the tree therefore bacteria start to attack it plus bananas produce ethylene gas. Ethylene gas causes the bananas to ripen and soften faster. Plastic bottles, etc. do not produce the ethylene gas.*
 - If the landfill keeps covering the trash each day, does the decomposition take longer or go quicker? Why? – *It will take longer because water is blocked in order for it not to get into the ground water, air takes space and it is covered to sunlight isn't readily available therefore the ingredients needed to decompose are eliminated.*

Lesson procedure –

- A. Show the students the following items: - *The items selected to be buried, food, plastic, egg shells, foil, paper*

- B. Ask the students which items they think will take the shortest time to decompose. – *Answers will vary depending on the objects used. Ex: banana, food, etc.*
- C. Ask the students which items they think will take the longest to decompose. – *Ex. Foil, plastic, etc.*
- D. Ask the students if there are any items that would not decompose. – *Ex. Foil, etc.*
- E. Keeping the students in their original groups, have one student in the group collect the supplies needed.
- F. Another student in the group fills in the first column of the chart. – Attachment 2
- G. Explain the experiment procedure to the students – Attachment 3
- H. Students do the experiment.
- I. Play the song [My Town](#) (link to music – click link under KU – J)
- J. Ask the students the following questions:
- What is the song about? – *Ex. Changes in the town, the environment is changing*
 - Do you notice a beat or rhythm? If so what is it? – *Jamaican rhythm, continuously repeating pattern – students “sing” the rhythm*
 - Does something repeat in the music? – *In my town*
- K. Students can either work in the same groups or individually to create lyrics of a song using one of the following topics: landfills, recycling, reuse or trash. (Examples: <http://www.deq.state.or.us/lq/pubs/docs/sw/curriculum/RRPart0217.pdf>)
- L. Students create music to go with their lyrics by either writing their own or using the music to a song they already know.
- M. The students take turns presenting the songs to the class.
- N. Following the experiment guidelines, one week after the trash was buried students check and measure the trash.
- O. Following the experiment, another week passes and the students measure their trash again as well as checking for decomposition.
- P. Ask the students the following questions:
- What did you notice about the (going through each object selected to be buried)? – *Ex: Some things will be gone, partly decomposed or nothing has changed depending on what they were. Most food should be at least partially decomposed*
 - Do you think every thing decomposes? Why or why not? – *Ex: No or we don't know if they actually will because the time will be too long to have documented. Yes, everything at some point in time decomposes*
 - What is your conclusion? – *Ex: Food decomposes quickly; other objects take a longer amount of time or don't decompose.*
 - What are ways to eliminate some of the things being put in the landfill? – *Ex; Recycling, reusing, composting, etc...*

- After doing this experiment is there anything you would do differently? – *Ex: recycle, reuse, think about ways to not put so much into the landfill*

Student assessment or final product to be developed:

- A. How long? chart
- B. Class participation
- C. Teacher observation
- D. Experiment
- E. Song

Extension activities

- A. Project GRAD Houston ELA lesson “Inky’s Ocean Adventure.”
- B. Project GRAD Houston math lesson “Ener G.”
- C. Extend the lesson to include the life cycle of one of the objects buried, for example, the banana.
- D. Students put their song on a poster board and illustrate it.
- E. Create a CD with all the students’ songs on it for each student to have.
- F. Visit a landfill to observe what actually is put in the landfill and how it is deposited.
- G. Extend the lesson to include composting.

Website links:

<http://www.lessonplanspage.com/ScienceHowMuchCompostableGarbageDoWeProduce46.htm>

http://www.peoplepoweredmachines.com/composter/_docs/howmuchgarbage.pdf

<http://www.socybertry.com/Issues/Strange-Trash-Facts.119304>

<http://littlegirlonthego.blogspot.com/2008/09/science-experiment-decomposers.html>

<http://beemp3.com/download.php?file=3806782&song=The+Green+Grass+Grew+All+Around>

<http://www.ecocarib.org/video-and-audio/environmental-songs>

How long?

Names _____

Date _____

Match each item with the number of years it takes for it to decompose.

Item	Time Period
_____ 1. Aluminum cans	A. 2 – 5 weeks
_____ 2. Glass bottles	B. 3 – 14 Months
_____ 3. Wooden chair	C. 20 years
_____ 4. Plastic bottles	D. 20 – 30 years
_____ 5 Banana	E. 30 – 40 years
_____ 6. Disposable diaper	F. 50 – 80 years
_____ 7. Steel cans	G. 100 years
_____ 8. Plastic bags	H. 200 – 500 years
_____ 9. Thread	I. 300 – 500 years
_____ 10. Nylon clothes	J. 1 Million years

How long? - KEY

Match each item with the number of years it takes for it to decompose.

	Item	Time Period
H	1. Aluminum cans	A. 2 – 5 weeks
J	2. Glass bottles	B. 3 – 14 Months
C	3. Wooden chair	C. 20 years
F	4. Plastic bottles	D. 20 – 30 years
A	5 Banana	E. 30 – 40 years
I	6. Disposable diaper	F. 50 – 80 years
G	7. Steel cans	G. 100 years
D	8. Plastic bags	H. 200 – 500 years
B	9. Thread	I. 300 – 500 years
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Decomposing

Names _____

Date _____

Fill in the chart and answer the questions.

1.

<i>Item</i>	<i>Approximate Size</i>	<i>Week 1</i>	<i>Week 2</i>	<i>Completely Decomposed</i>

2. Which items decomposed completely? _____

3. Which items are partially decomposed? _____

4. Which items did not start decomposing? _____

5. Conclusion: _____

Decomposition Experiment

1. Collect all the supplies.
2. Put 1.5 inches of soil in the bottom of the container.
3. Dampen the soil with water.
4. Record the measurements of each item in the second column of the chart.
5. Bury the items in the soil.
6. Cover the containers with something clear.
7. Put the containers in the sun.
8. In one week, pull the items out of the soil.
9. Measure the items.
10. Put the measurement of the items under "Week 1."
11. If the item has either decomposed or started to decompose put a *YES* in the "Week 1" column.
12. If the item has not started to decompose put a *NO* in the "Week 1" column.
13. Bury the items again
14. Wait another week; pull the items out of the soil.
15. Measure the items.
16. Put the measurement of the items under "Week 2."
17. Put a check mark (✓) in the last column indicating which items completely decomposed.
18. Optional: continue experiment

National Standards

Science

NS.5-8.1 SCIENCE AS INQUIRY

- Abilities necessary to do scientific inquiry
- Understandings about scientific inquiry

NS.5-8.2 PHYSICAL SCIENCE

- Properties and changes of properties in matter

NS.5-8.6 PERSONAL AND SOCIAL PERSPECTIVES

- Populations, resources, and environments

Music

NA.5-8.2 PERFORMING ON INSTRUMENTS, ALONE AND WITH OTHERS, A VARIED REPERTOIRE OF MUSIC

- Students perform music representing diverse genres and cultures, with expression appropriate for the work being performed

NA.5-8.4 COMPOSING AND ARRANGING MUSIC WITHIN SPECIFIED GUIDELINES

- Students compose short pieces within specified guidelines (e.g., a particular style, form, instrumentation, compositional technique), demonstrating how the elements of music are used to achieve unity and variety, tension and release, and balance
- Students arrange simple pieces for voices or instruments other than those for which the pieces were written

TAKS Objectives

Science

Scientific processes. The student conducts field and laboratory investigations following home and school safety procedures and environmentally appropriate and ethical practices. The student is expected to: (A) demonstrate safe practices during field and laboratory investigations; and (B) make wise choices in the use and conservation of resources and the disposal or recycling of materials.

Scientific processes. The student uses scientific inquiry methods during field and laboratory investigations. The student is expected to: (A) collect information by observing and measuring; (C) analyze and interpret information to construct reasonable explanations from direct and indirect evidence; (D) communicate valid conclusions; and (E) construct simple graphs, tables, maps, and charts to organize, examine and evaluate information.

Scientific processes. The student knows that information, critical thinking, and scientific problem solving are used in making decisions. The student is expected to: represent the natural world using models and identify their limitations

Music

Perception. The student describes and analyzes musical sound and demonstrates musical artistry. The student is expected to: identify music forms presented aurally such as AB, ABA, and rondo and theme and variations.

Creative expression/performance. The student creates and arranges music within specified guidelines. The student is expected to: create rhythmic phrases; and create melodic phrases and create/arrange simple accompaniments.