 **NSF Sustainable Energy Grant RET Lesson** 

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| **Lesson Title:** Break it Down! | **Grade Level/Subject:**  3rd – 5th grade |
| **Maximum # of Students:** students in class | **Total Time Required:** 2-10 weeks, 2-5 min check in/day |
| **Prior Knowledge Needed: Academic vocabulary:** Organic Material, Inorganic Material, Decomposers, Ecosystem, Biodegradable, Microorganisms | |

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| **Materials and Preparation:**   |  |  | | --- | --- | | * Copy of “My Materials” for each student (attached at end) * 2- 5 gallon storage containers with lids for each student or group if you choose to have them work in groups * Water Spray Bottle * Dirt (this must be taken from outside) * 3 organic items example: banana peel, orange peel, apple core, etc * 3 inorganic items example: styrofoam cup, plastic water bottle, baby wipe, etc * Science Journal for each student * Jumbo Wood Craft Sticks * Digital Scale * Drill | * Propellers * Tubing * Solar panels (2V 400mA) * Multi-meters * Assorted LEDs * Solar motors * Pairs of clamp wires * Wire strippers * Protractors | |

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| **Performance Objectives/Learning Targets:**  Students will understand different methods of waste removal and reuse. Students will understand the value of composting and be able to create their own compost. Students will understand what materials can be composted and what materials cannot. Students will understand there are small organisms that help break down organic material in compost | |
| **Standards:** | |
| **Lesson Procedure** | |
| **Before:** | Ask the question “What materials do you use every day?” Brainstorm all the materials they come up with: paper, plastic, rubber, metal, glass, etc. Then ask them “What do you do with the items when you are finished with them?” Discuss the difference between recycling and throwing items in the trash or just on the ground.  Explain the “My Materials” activity. For the next two days, the students will be recording some of the materials they use during the day. They will record the item used, what it was made of, and what they did with the item when they were finished with it. The students will need to document 15 different items they use in the two day period. |
| **During:** | Students will create their own “compost” bucket. They will observe the items placed in the buckets weekly for 30 or 60 days. The amount of time is entirely up to the teacher and how much time their schedule allows.  Give each student their 2 plastic storage containers. These should have predrilled holes in the bottom to allow water to flow out. The teacher should probably do this part so the students do not have to use a drill.  Students will provide 6 items to place in their buckets. These items can come from home so they are more familiar to the student and items they use in their everyday lives, from the cafeteria, or donated from somewhere. Each student (or group) needs 3 organic items and 3 inorganic items to place in their buckets. Students should weigh each item on the digital scale and record the starting weight of each one.  Take the buckets outside and fill them ¾ of the way full with dirt. This should be natural soil, not potting soil.  Once the soil is in the buckets, place the 3 organic items into one bucket and the 3 inorganic items in the other bucket. Bury them in the soil. Use the water sprayer bottle to spray the soil until it is wet, but not soggy. Have students water their compost buckets 1-2 times per week.  Find a place outside to keep your compost buckets for the duration of the experiment. Have students observe the items in their buckets weekly and record their observations in their science journal. They can use the wood sticks to dig in the dirt. |
| **After:** | At the end of the specified time for the experiment, have the students remove the items from each bucket and weigh them again. They should find the differences in the beginning weight and ending weight. This may require a review of how to subtract decimals.  Have the students write a few paragraphs about their observations. They can compare and contrast organic material vs. inorganic materials or just write about their findings and what surprised them or what else they would like to discover  Watch Generation Genius “Human Impacts on the Environment” Use the discussion questions to lead class discussion. |
| **5E Model:** *Engage, Explore, Explain, Evaluate, Elaborate*  Engage: priming questions  Explore: Create your own compost activity  Explain: Recycling vs Trash vs Compost lesson  Evaluate: My materials worksheet completion, compost completion and discussion  Elaborate: Elaboration video and in-class discussion | |

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**My Materials**

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| **Item Used** | **What is the item made of?** | **What did you do with the item when you finished with it?** |
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