PURPLE PLOW
Uncovering STEM Solutions

PUZZLERS #46

Build a Bioreactor

1 HOUR

STANDARDS & CONNECTIONS:

NGSS.HS-ETSI-I-4, NGSS.MS-ETSI-I-4, NGSS.3-5-ETSI-I-3 3, NGSS.5-LS2-I, NGSS-ESS2-I

BACKGROUND:

It is estimated that "plate waste" in schools participating in the National School Lunch Program through the USDA yields loses of over $600 million dollars per year.[1] Schools face many challenges in minimizing waste. Students may not be hungry that day; students may not be able to eat the foods they prefer; or they simply may not realize they were taking too much food. To limit the amount of food wasted and assist in reduction of cost, schools can audit waste and look into unique ways to use food waste. Several schools across the country have developed composting programs to help eliminate waste from lunch. Investigate what types of lunch foods make for good composting material.

SUGGESTED MATERIALS:

2-L plastic soda bottle, a small container to fit inside it, nail, tape, knife, insulation materials, mesh screen, thermometer (long), food waste scraps, cardboard or wood shavings, plastic tubing

QUESTION:

What types of foods can be digested in a bioreactor?

CREATE	TEST & IMPROVE	SHARE
Create a bioreactor to investigate how various types of food commonly found in school lunch can be broken down into compost.	Students will test their prototype, seek areas of improvement and make changes where needed.	Students will share what they've created and their lessons learned.

Conduct a food waste audit at your school. Come up with possible solutions to reduce food waste and share this plan with your administration.
Set up a composting program with the help of local area business or agriculture professionals.

[1] https://www.ers.usda.gov/webdocs/publications/43131/31216_efan02009.pdf?v=41423
https://www.lifelab.org/composting/school-composting/
http://greenmountainfarmtoschool.org/wp-content/uploads/2016/01/Guide-to-Staring-a-School-Compost-Program.pdf
https://frac.org/programs/national-school-lunch-program
https://www.usda.gov/oce/foodwaste/resources/K12_schools.html
https://www.cbsnews.com/news/school-lunch-fruits-and-veggies-often-tossed-in-trash-study-finds/

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