

Recycling...It's a Math thing too!

Content Area(s)/Course/Grade:

Algebra 1/ Geometry

Unit:

Weight, units, and Approximate measurements.

Lesson Topic:

Recycling the Math way

Date:

Teacher:

Devin C. Smith

School:

Choices Academy

Indicator(s)/Sub-Outcome(s)/Expectation(s):

[CCSS.Math.Content.5.MD.C.5.b](#)

Apply the formulas $V = l \times w \times h$ and $V = b \times h$ for rectangular prisms to find volumes of right rectangular prisms with whole-number edge lengths in the context of solving real world and mathematical problems.

[CCSS.Math.Practice.MP1](#) Make sense of problems and persevere in solving them.

[CCSS.Math.Practice.MP2](#) Reason abstractly and quantitatively.

[CCSS.Math.Practice.MP3](#) Construct viable arguments and critique the reasoning of others.

[CCSS.Math.Practice.MP4](#) Model with mathematics.

[CCSS.Math.Practice.MP5](#) Use appropriate tools strategically

[CCSS.Math.Practice.MP7](#) Look for and make use of structure.

Student Outcome(s):

- Students will explore the various recycling container option.
- Students will calculate the approximate weight of recycled goods.

Context for Learning

A model can be very simple, such as writing total cost as a product of unit price and number bought, or using a geometric shape to describe a physical object like a coin. Even such simple models involve making choices. It is up to us whether to model a coin as a three-dimensional cylinder, or whether a two-dimensional disk works well enough for our purposes. Other situations—modeling a delivery route, a production schedule, or a comparison of loan amortizations—need more elaborate models that use other tools from the mathematical sciences. Real-world situations are not organized and labeled for analysis; formulating tractable models, representing such models, and analyzing them is appropriately a creative process. Like every such process, this depends on acquired expertise as well as creativity.

Instructional Delivery

Opening Activities/Motivation:

(Watch YouTube clip: Die Hid 3: Jugs Problem (https://youtu.be/BVtQNK_ZUJg))

You have a 3-gallon and a 5-gallon jug that you can fill from a fountain of water. The problem is to fill one of jugs with exactly 4 gallons of water. How do you do it?

Solution:

Fill up the 3-gallon tank and pour it into the 5, refill the 3-gallon again and top off the 5. This leaves 1 gallon left in the 3-gallon tank. Dump out the 5-gallon tank and pour in the 1 gallon. fill up the 3-gallon tank completely again and pour it into the 5 to make 4.

Now, this information is going to be useful for students to determine the approximate weight of recycled goods that the students collect through out the school.

Procedures:

Student Activity- Task #1: Determine the weight of collected recycling goods.

Just this school year, we have explored options that would allow our school to be environmentally friendly. After many suggestions provided the student body here at school, we decided to start recycling everyday things. Boxes of various sizes were located through the building to use as recycling container. Students need to determine how to determine the weight of the recycled goods. The only thing we have is a digital scale made for calculating human weight.

Suggestions:

Person weights in. Same person, steps onto the scale again, this time with the container. Empty the contents of the container and then while holding the empty container step onto the scale use the information from the collected information to determine the weight of the recycle materials.

Student Activity - Task #2: Approximate Weight

A generous donation was made to your school recently. Blue Recycling containers (made of recycled plastics) was given to your school for each one your classrooms. These containers can hold a significant amount of recycling. Therefore, my weigh way more than expected. Your task is to determine a way to measure the weight of the recycled goods. Students will need to do some research how to go about measuring, because the batteries in the scale have gone bad and scale is not working.

Suggestions

Have students research items in which can be placed inside of the container at would fill the container and have the approximate weight of the recycled goods. A ream paper (Standard copy paper) approximately weighs 5 lbs. Have student place unopen reams of papers in the containers, to determine the maximum weight that can be held by the container. (Approximate a full container of paper weighs about 4 reams of paper \approx 20 lbs.

Assessment/Evaluation (Formative/Summative)

How precise an answer do we want or need? What aspects of the situation do we most need to understand, control, or optimize? What resources of time and tools do we have? The range of models that we can create and analyze is also constrained by the limitations of our mathematical, statistical, and technical skills, and our ability to recognize significant variables and relationships among them. Diagrams of various kinds, spreadsheets and other technology, and algebra are powerful tools for understanding and solving problems drawn from different types of real-world situations.