Task: Calculating Bulk Weight in a Product and Using Excel to Graph the Results
Science 6th Grade

Colortech in Morristown, Tennessee produces a plastic pellet out of raw materials to be used by other corporations in the production of plastic bottles, plastic bags, toys, and countless other products. Throughout the workday, onsite Quality Labs monitor the product being produced. One of the tests they conduct is for bulk weight. The bulk weight of the product must be within the parameters of each customer's batch sheet.

Susan, who works in the Quality Lab, is required to find the mass of her product. Susan needs to use a 100mL-graduated cylinder of the current product. She will measure the cylinder and then zero out the metric weight. Next, Susan will add 100mL of product to the graduated cylinder and find the weight in grams. She will convert the weight to pounds by multiplying by 62.43 and then divide it by 100ML to get her final answer in pounds per cubic foot.

BULK WEIGHT (weight in grams x 62.43)/volume100ML= x lbs/ft^3

To make this process applicable and usable in a sixth grade lab, change the materials inside the graduated cylinder. Some ideas are popped popcorn versus un-popped; sand, water and rice can all be compared. Basically anything that will fit into the cylinder. The teacher may also have access to a pan balance instead of a digital scale.

Excel is a program used in most industry. For this reason, the final step in this lesson asks the student to develop chart using an Excel spreadsheet. The formulas are premade in the "insert graph" feature on Excel. This will give a basic introduction to Excel. Students will also need to analyze their choices for charts and graphs and pick the one that best represents their data.

A. Students will measure 100mL of any batch in a graduated cylinder
B. Students will find the mass in grams using a weight or pan balance
C. Next find the bulk weight as US industry does by following the noted equation
D. Repeat the experiment with multiple "batches"
E. Represent the data in an Excel produced chart or graph
F. Present their findings
G. Analyze the graph choices of other groups. (Pie charts will not represent the data.)

Common Core State Standards

CCSS.MATH.CONTENT.6NS.B.2
Fluently add, subtract, multiply, and divide multi-digit numbers using the

standard algorithm for each operation.

Math Practices:

1. *Make sense of problems and persevere in solving them.*
2. *Construct viable arguments and critique reasoning of others.*
3. *Model with mathematics*
4. *Use appropriate tools strategically*
5. *Attend to precision*

Science SPI Standards addressed:

SPI 0607.Inq.2
Select tools and procedures needed to conduct a moderately complex experiment.
SPI 0607.Inq.3
Interpret and translate data in a table, graph, or diagram.

Essential Understandings

What key insights should students take from participating in this task?
MATH

- *Multiply by decimals*
- *Use an algorithm*
- *Divide multi-digit numbers*
- *Charts and graphs*

SCIENCE

- *Scientific tools*
- *Measurement*
- *Interpret Data*
- Communicate scientific understanding using descriptions, explanations, and models.

Possible Solutions/Solution Paths

What solutions or solution paths are acceptable in achieving a correct response for this task? Be sure to address all parts of the task.

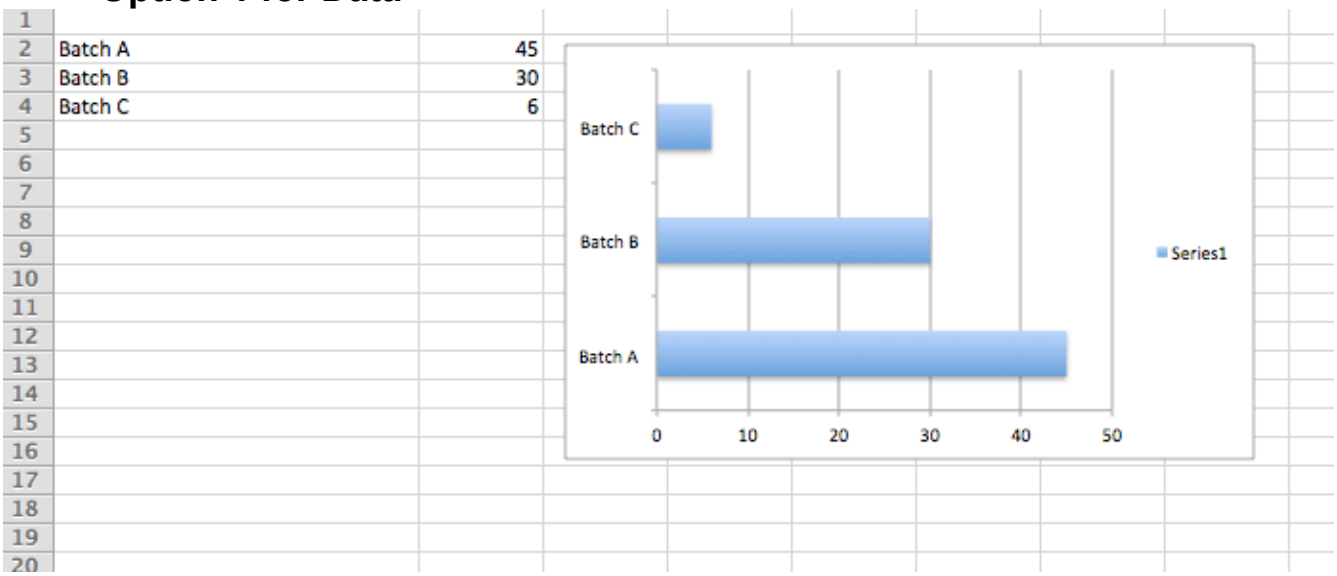
A. *Students may find their batches' weight is 100grams. The formula would look like this:*

(100g x 62.43) / 100mL = 100 lb/ft^3

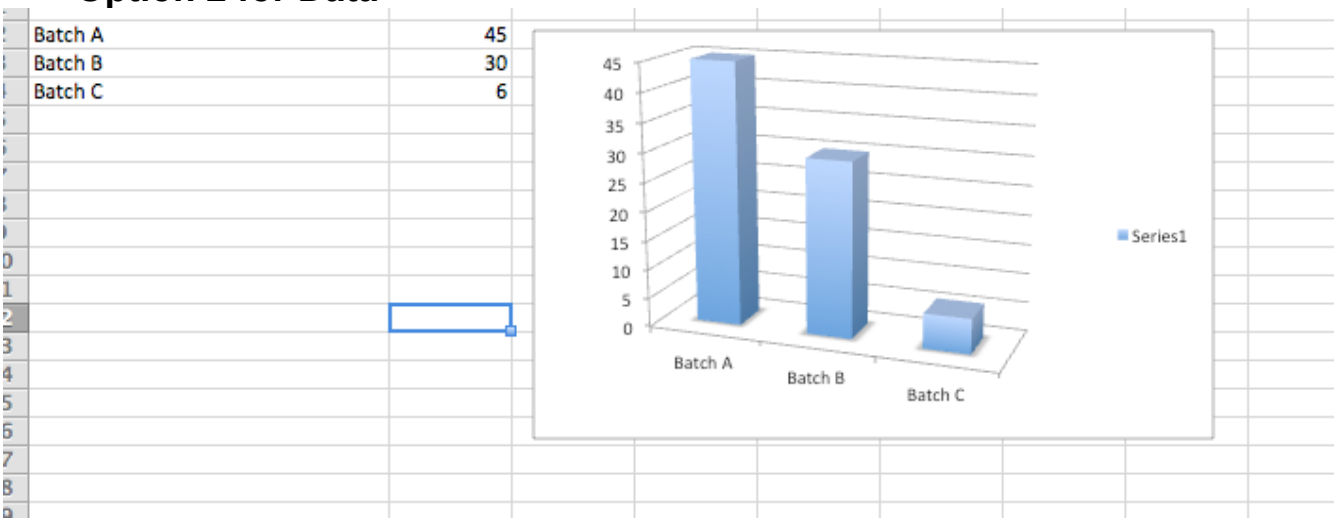
B. Students may record the standards horizontally or vertically

C. Students will represent the data collected for multiple batches in a chart or graph using Excel

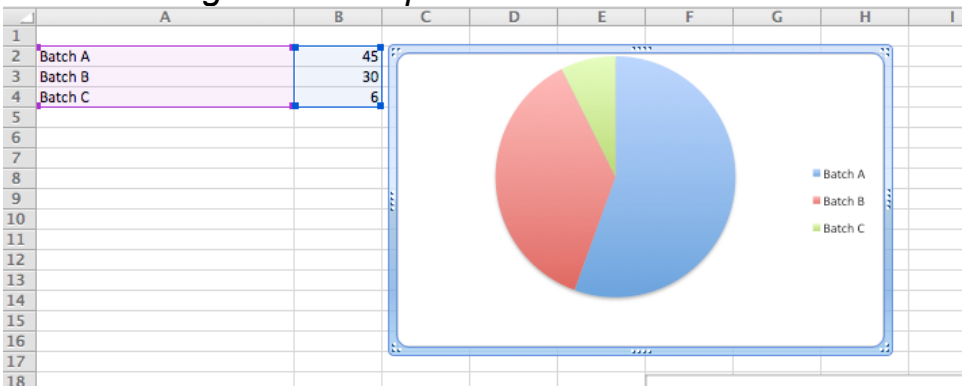
Option 1 for Data



Option 2 for Data



The following is not an option for student Data.

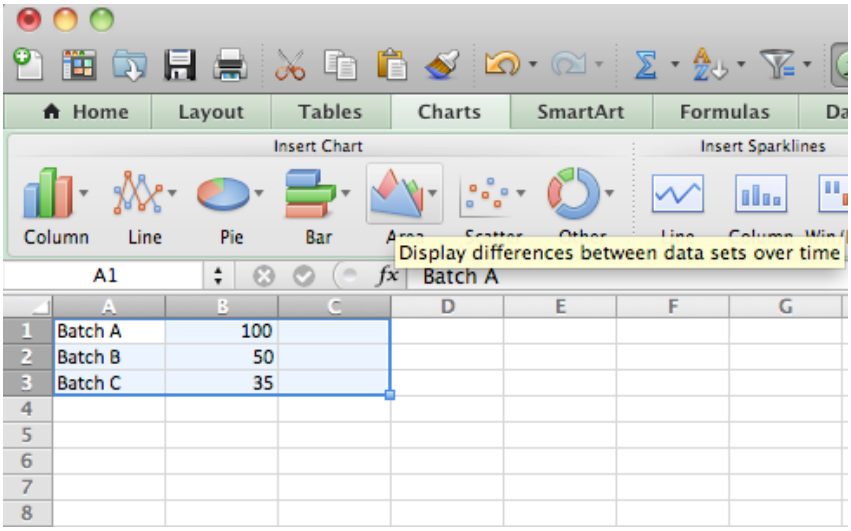


Additional Teacher Information

Add any additional notes that will help the teacher execute the task including necessary manipulatives, equipment, etc., and possible students misconceptions that may need to be addressed.

EXCEL TIP:

Teachers simply need to highlight the data collected and then Choose the charts function.



REMINDER:

Students will need to account for the weight of the graduated cylinder before they put tgrams in the formula.