

Brittany Williams

Performance Assessment

Context:

- This Performance Assessment is for a tenth-grade geometry class. In this class students learn about volumes and surface areas of multiple solid shapes and how that applies to real-world situations.
- Students will work in small groups to examine the surface area and volume of cereal boxes. Students will create a new cereal container that holds the same amount of cereal (volume) but uses less cardboard (less surface area).
- Common Core Standards
 - G.GMD.3- Use volume formulas for cylinders, pyramids, cones, and spheres to solve problems.
 - G-MG.3 Apply geometric methods to solve problems (e.g., designing an object or structure to satisfy physical constraints or minimize cost; working with typographic systems based on ratios.)

Essential Question:

- Can you have two containers with the same volume but different surface areas?

GRASPS Task Design:

- Goal and Role: You are part of a team that wants to reduce unneeded waste. The company that recruited you package cereal and they want you to come up with a greener solution to sell cereal in without changing the volume sold.
- Audience: You need to find a container to present to the cereal company that fits their needs and criteria. The cereal company has recently decided to be greener and therefore need help to find new containers for their product.
- Situation: The challenge is to create a new container that holds the same amount of cereal that it always has but that produces less waste. You must find a way to do this using less cardboard than what the cereal company was using before.
- Product, Performance, and Purpose: You will create a new container for your company and then make a presentation to sell it to them. You will make a mock-up of the container on geogebra and a proto type.
- Standards and Criteria for Success: Your presentation must include your final product and some of the other options you tried. You will present your new container to the cereal company and give a thorough explanation of why you decided on your container and why it fits their criteria.

Vignette:

You are part of a green team that helps companies be greener and produce less waste. Your team is one of many interviewing for a job that wants your help reducing the amount of cardboard they use in their cereal packaging without losing the amount of cereal sold in the packages. You will create and give a presentation to the company about the solution or solutions you have found for their packaging dilemma. You and your group will also create a digital sketch of the new container as well as make a real prototype to present to the company. The group with the least amount of cardboard will win the job. Good luck to all!

Performance Assessment Plan:

- *Introduction (two 50 minute class periods)*
 - Present solid shapes and how to find surface area and volume of those solid shapes (i.e. rectangular prism, cone, cylinder, etc.). We will be practicing these formulas on day one and two. Students will need to know how to find these volumes and surface areas to complete the project.
- *Begin project work (three 50 minute class periods)*
 - Student groups will have three class periods to work on their construction and to find the correct shape and dimensions that fit the company's criteria. They will have access to computers (via the computer lab), calculators and cardboard to construct their design. If the groups need any more time to work together they will have to figure out a time outside of class to work with the group to complete the project and presentation.
- *Presentation (one-two 50 minute class periods)*
 - Student groups will present their finished product to the class and show the prototype, the math behind the new container. They will also have to convince the company as to why they should pick their container to use.

Scoring Guide

	20 points	10 points	0 points
Container	Group has a model of the container on geogebra and a physical model	Group has a model of the container on geogebra or a physical model	Group does not have a model of the container
Presentation	Group has a presentation on an online tool (google slides, prezi, etc.), explains why they chose the container they did and how it works, every member in the group has a part	Group has at least two of the following: a presentation on an online tool (google slides, prezi, etc.), explains why they chose the container they did and how it works, every member in the group has a part	Group does not have a presentation that explains container and not every member has a part
Math Criteria	Group presents the math they have to support the company's criteria for the box and	Group presents the math they have but doesn't support the criteria or does not	Group does not present math on their container

	shows how it compares to the original container	compare it to the original	
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Narrative

Technology- Students will be creating a presentation on an online tool such as google slides or a site like Prezi. They will need to collaborate with their group members to create the presentation and have it be one cohesive project. They will also need to create a digital prototype on an app called Geogebra. This app can do a lot with shapes and other geometric topics. Ideally the students will have used this app before in the class. I will be available during the three class periods when the groups are working on their projects to offer help and advice when it comes to these specific technologies. I think by using these technologies students will be able to understand how to apply presentation skills as well as apply geometric concepts to real world situations.

Thought Process- I want my students to participate in this project to show them how geometric concepts could apply in the world beyond the classroom. I also wanted them to utilize some technologies that they may or may not have been exposed to so they could get practice with using technology as a way to support a claim they had. This performance assessment will touch all the facets of understanding. Facet 1: Students will have to explain how their solid shape is a better design for the company to use, therefore, they will have to understand how surface area and volume formulas work. Facet 2 and 3: Students will have to apply what they have learned about solid shapes to create a new shape and show their interpretation of the company's criteria. Facet 4: Students will show their own perspective on the criteria the company set about the new container and how they are planning to rectify the situation. Facet 5: Students are having to empathize with the company's want to become green and use less waste to understand the task at hand. Facet 6: Students will understand that it is a lot of work for companies to become more ecofriendly and will have the new knowledge of this and will be able to appreciate it.

Self-assessment- I believe this performance assessment does a good job of assessing my students on their understanding of the standards we are addressing. They not only have to know the formulas and what solid shapes are but they have to be able to apply those formulas to a real world situation and they will have to understand the concept fully to be able to put it all together in their projects. I think Wiggins would be pleased with my assessment. I have hit all 6 facets of understanding and I know it assesses my student thoroughly. I think that this project will be a good learning and assessment tool for my geometry students in the future.

Peer assessment- Rhonda, a fellow teacher at my school reviewed this project for me. She said that she liked my idea for this performance assessment. It will make my students think and apply the skills we have learned in class and will make them truly understand the content. Rhonda gave me some suggestions for the project, mainly for the rubric. She said I should try to add another row of criteria to be evaluated on because I did not address my essential question fully in the rubric. She said I should also add a student survey at the end of the project where students can discuss what exactly their roles were in their groups and who did the most work/ who worked the least because you cannot always monitor everything.