Rain Barrel Manufacturer

Performance Task

Introduction

Intro for Teachers:

Rain barrels are used to collect and store rainwater. Collected rainwater can be stored and used later to water plants and lawns. It can also be used to wash cars. By collecting this water and using it later, people can reduce the amount of water they need. Reusing rainwater can also help lower household water bills. Collecting rainwater is good for the environment, too. When rainwater is not collected, it washes over lawns, sidewalks and roads, picking up dirt and other pollution and dropping it in our sewers. By collecting rainwater, we are recycling and reducing the pollution of our water. Rain barrels can be used outside homes, businesses and even schools.

This performance task that provides students with an opportunity to act like a manufacturer as they design a rain barrel and allows students to explore geometric relationships, states of matter and human impact on the environment, as they work through the task to create and share a rain barrel design.

This task can address a variety of concepts in elementary school including:

Science and Engineering Practices

Matter and Itâ€™s Interactions

Measurement and Data

Earth and Space Science

Writing, Reading, Speaking and Listening

This performance task will empower students to have a positive impact on their environment while applying creative and critical thinking skills to an authentic situation. Please review the task and consider using it in your elementary school classroom.

Intro for Students:

Rain barrels are used to collect and store rainwater. Collected rainwater can be stored and used later on to water plants and lawns. It can also be used to wash cars. By collecting this water and using it later, people can reduce the amount of water they need. Reusing rainwater can also help lower household water bills. Collecting rainwater is good for the environment too. When rainwater is not collected, it washes over lawns, sidewalks and roads, picking up dirt and other pollution and dropping it in our sewers. By collecting rainwater, we are recycling **and** reducing the pollution of our water.

Big Idea / Essential Questions

Big Idea

- Geometric relationships can be described, analyzed, and classified based on spatial reasoning and/or visualization.
- People acting individually and/or as groups influence the environment.
- Solid, liquid and gaseous earth materials all circulate in large scale systems at a variety of time scales, giving rise to the water cycle, ocean currents, weather, and climate.

Essential Questions

- How are spatial relationships, including shape and dimension, used to draw, construct, and represent real situations or solve problems?
- How do humans influence the environment?

G.R.A.S.P.

Goal

You are part of a team of manufacturers whose goal is to expand your business and bring in more money. You are aware that water conservation is an important issue in many regions across the United States and therefore you have decided to design and manufacture rain barrels. These barrels will need to be environmentally safe and made from a material that will not contaminate the water they collect.

Role

You are part of a team of manufacturers looking to expand your business and bring in more money. You have figured out that water conservation is becoming more and more important in different communities. Therefore designing and building rain barrels would help bring more business to your company and help protect our environment.

Audience

Your audience will be retailers attending a national environmental awareness conference. These individuals will be looking for new products to sell that encourage water conservation. Your design and presentation will be important for attracting retailer attention.

Situation

Rain barrels are used to collect and store rainwater. Collected rainwater can be stored and used later on to water plants and lawns. It can also be used to wash cars. By collecting this water and using it later, people can reduce the amount of water they need. Reusing rainwater can also help lower household water bills. Collecting rainwater is good for the environment too. When rainwater is not collected, it washes over lawns, sidewalks and roads, picking up dirt and other pollution and dropping it in our sewers.

By collecting rainwater, we are recycling and reducing the pollution of our water.

Rain Barrel Source

Products

1. Artist Rendering

Create two to three pictures that show the designs you will use for your rain barrels. Make sure to clearly show and label their shape, the materials you think they should be made from and their colors. Please be sure to make them aesthetically pleasing for people to place them outside their home.

- What features of a rain barrel should be present and which features are optional?
- What are the differences between different brands of rain barrels?
- How does the location of rain barrels affect the way they could look?

Artist Rendering - Rain Barrel Manufacturer

Achievement Levels	1	2	3	4
Design Considerations (x1)	Design choices reflect little consideration of the audience for whom the product is created.	Design choices reflect some consideration of the audience for whom the product is created.	Design choices reflect satisfactory consideration of the audience for whom the product is created.	Design choices reflect thorough consideration of the audience for whom the product is created.
General Formatting (x1)	Graph paper or a computer graphic tool is used to create the drawing. The drawing's size makes the details difficult to see.	Graph paper or a computer graphic tool is used to create the drawing. The drawing's size makes it somewhat readable. Some details are clear.	Graph paper or a computer graphic tool is used to create the drawing. The drawing is large enough that the details are clear. It is mostly neat.	Graph paper or a computer graphic tool is used to create the drawing. The drawing is large enough for details to be clear. The drawing is neat.
Materials and Environment (x1)	Product demonstrates minimal understanding of the properties of materials selected as related to the environment they will be used in.	Product demonstrates some understanding of the properties of materials selected as related to the environment they will be used in.	Product demonstrates satisfactory understanding of the properties of materials selected as related to the environment they will be used in.	Product demonstrates strong understanding of the properties of materials selected as related to the environment they will be used in.

2. Scale Drawing

Create a scale drawing of a cylindrical rain barrel or rectangular prism rain barrel. Be sure to provide all dimensions and measurements such as heights, lengths, widths, volumes, or circumferences. This drawing will be helpful when it is time to build the rain barrels.

- What is the average size of different types of rain barrels?
- What dimensions will you use for your rain barrel?

Scale Drawing - Rain Barrel Manufacturer

Achievement Levels	1	2	3	4
Drawing (x1)	Drawing includes very few labels and details. The details are not very clear or easy to identify.	Drawing includes some labels and details that highlight features. The details are relatively clear and easy to identify.	Drawing includes labels and details that highlight features. The details are clear and easy to identify.	Drawing inlcudes excellent use of labels and details that highlight features. The details are very clear and easy to identify.

Achievement Levels	1	2	3	4
Volume (x1)	Product minimally explains the importance of volume and its calculation when creating a new rain barrel.	Product somewhat explains the importance of volume and its calculation when creating a new backpack.	Product explains the importance of volume and its calculation when creating a new rain barrel.	Product clearly explains the importance of volume and its calculation when creating a new rain barrel.
Engineering and Design (x1)	Product demonstrates minimal understanding of the criteria and constraints of the design problem with regard to size, materials, and function of the product.	Product demonstrates some understanding of the criteria and constraints of the design problem with regard to size, materials, and function of the product.	Product demonstrates adequate understanding of the criteria and constraints of the design problem with regard to size, materials, and function of the product.	Product demonstrates strong understanding of the criteria and constraints of the design problem with regard to size, materials, and function of the product.
Design Considerations (x1)	Design choices reflect little consideration of the audience for whom the product is created.	Design choices reflect some consideration of the audience for whom the product is created.	Design choices reflect satisfactory consideration of the audience for whom the product is created.	Design choices reflect thorough consideration of the audience for whom the product is created.
Strategic Choice of Math Tools (x1)	Student considers few tools available. Reasons provided for tool(s) selected demonstrates lack of strategic thinking.	Student considers few tools available. Reason provided for tool(s) demonstrates minimal strategic thinking.	Student considers most tools available. Reason provided for tool(s) selected demonstrates sufficient strategic thinking.	Student considers all tools available. Reason provided for tool(s) selected demonstrates strong strategic thinking.

3. Product Information Flyer

Choose one rain barrel design and create a one-page flyer that describes, in detail, the features of your chosen rain barrel design. This one page should provide customers with all the necessary information to make an informed decision regarding the value of your rain barrel and why they should purchase this rain barrel. Please include a picture of your rain barrel.

- What is the impact of your rain barrel on water conservation?
- What makes your rain barrel design stand out?
- What is the volume of water that your rain barrel can hold and why is this important?

Product Information Flyer - Rain Barrel Manufacturer

Achievement Levels	1	2	3	4
Persuasive Writing (x1)	Audience is not persuaded due to incomplete explanation.	Audience may or may not be persuaded through partial explanation provided that touches upon important points.	Audience is somewhat persuaded through adequate explanation that includes important points supported by facts and details.	Audience is persuaded through thorough explanation which emphasizes important points supported by facts and details.
Mechanics (x1)	The product contains numerous spelling and grammar errors and issues with sentence structure.	The product contains some spelling and grammar errors with complete sentences that keep audience interest.	The product contains minimal spelling and grammar errors with complete sentences that keep audience interest.	The product is free of spelling and grammar errors with complete sentences that keep audience interest.
Engineering Design (x1)	Product demonstrates minimal understanding of the criteria and constraints of the design problem with regard to size, materials, and function of the product.	Product demonstrates some understanding of the criteria and constraints of the design problem with regard to size, materials, and function of the product.	Product demonstrates adequate understanding of the criteria and constraints of the design problem with regard to size, materials, and function of the product.	Product demonstrates strong understanding of the criteria and constraints of the design problem with regard to size, materials, and function of the product.
Volume (x1)	Product minimally explains the importance of volume and its calculation when creating a new rain barrel.	Product somewhat explains the importance of volume and its calculation when creating a new rain barrel.	Product explains the importance of volume and its calculation when creating a new rain barrel.	Product clearly explains the importance of volume and its calculation when creating a new rain barrel.

Achievement Levels	1	2	3	4
Humans and Natural Resources (x1)	Product minimally explains the way individuals and communities utilize rain barrels to preserve Earthâ€™s natural resources.	Product somewhat explains the way individuals and communities utilize rain barrels to preserve Earthâ€™s natural resources.	Product adequately explains the way individuals and communities utilize rain barrels to preserve Earthâ€™s natural resources.	Product fully explains the way individuals and communities utilize rain barrels to help preserve Earthâ€™s natural resources.

4. Oral Presentation

Provide a 2-3 minute oral presentation for the retailers. Be sure to explain why conserving and recycling water is important for people and the Earth. Show them your new rain barrel design. Talk about what materials its made from, the dimensions and how much water it holds, its shape and any other interesting features it has. Be sure your presentation persuades store owners to sell the rain barrels in their stores.

- Where do people usually place rain barrels? How can this affect the way a rain barrel is designed?
- What material will you rain barrel be made from?
- Why are rain barrels important for people and the environment?

Oral Presentation - Rain Barrel Manufacturer

Achievement Levels	1	2	3	4
Volume (x1)	Product minimally explains the importance of volume and its calculation when creating a new rain barrel.	Product somewhat explains the importance of volume and its calculation when creating a new rain barrel.	Product explains the importance of volume and its calculation when creating a new rain barrel.	Product clearly explains the importance of volume and its calculation when creating a new rain barrel.
Delivery (x1)	Presenter makes eye contact, has good posture and adequate volume throughout little of the presentation.	Presenter makes eye contact, has good posture and adequate volume throughout some of the presentation.	Presenter makes eye contact, has good posture and adequate volume throughout most of the presentation.	Presenter makes eye contact, has good posture and adequate volume throughout the whole presentation.
Focus (x1)	The purpose of the presentation (informational, persuasive) and the position taken by the speaker are minimally outlined in the beginning of the presentation. The content throughout lacks alignment with the stated goals.	The purpose of the presentation (informational, persuasive) and the position taken by the speaker are partially outlined in the beginning of the presentation. The content throughout somewhat aligns with the stated goals.	The purpose of the presentation (informational, persuasive) and the position taken by the speaker are sufficiently outlined in the beginning of the presentation. The content throughout aligns adequately with the stated goals.	The purpose of the presentation (informational, persuasive) and the position taken by the speaker are well outlined in the beginning of the presentation. The content throughout aligns tightly with the stated goals.
Materials and Environment (x1)	Product demonstrates minimal understanding of the properties of materials selected as related to the environment they will be used in.	Product demonstrates some understanding of the properties of materials selected as related to the environment they will be used in.	Product demonstrates satisfactory understanding of the properties of materials selected as related to the environment they will be used in.	Product demonstrates strong understanding of the properties of materials selected as related to the environment they will be used in.
Engineering and Design (x1)	Product demonstrates minimal understanding of the criteria and constraints of the design problem with regard to size, materials, and function of the product.	Product demonstrates some understanding of the criteria and constraints of the design problem with regard to size, materials, and function of the product.	Product demonstrates adequate understanding of the criteria and constraints of the design problem with regard to size, materials, and function of the product.	Product demonstrates strong understanding of the criteria and constraints of the design problem with regard to size, materials, and function of the product.
Preserving Natural Resourcces (x1)	Product minimally explains the way individuals and communities utilize rain barrels to preserve Earthâ€™s natural resources.	Product somewhat explains the way individuals and communities utilize rain barrels to preserve Earthâ€™s natural resources.	Product adequately explains the way individuals and communities utilize rain barrels to preserve Earthâ€™s natural resources.	Product fully explains the way individuals and communities utilize rain barrels to help preserve Earthâ€™s natural

resources.

Achievement Levels	1	2	3	4