

Team Members:

 1. _____ 2. _____

Total Points

Workbook: /7 pts

Challenge: /20 pts

What is Volume?

Fill in the blanks in the statement below.

1. _____ is the amount of three-dimensional space an object occupies. Volume is measured in _____ of a fixed size, such as cubic inches (in³) or cubic centimeters (cm³).

Assemble a Rectangular Prism and Cylinder

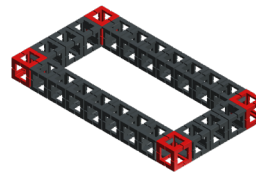
Place a check in each box as each step is completed.

2. Assemble a **rectangular prism** using Kid Spark engineering materials.
3. Assemble a **cylinder** using Kid Spark engineering materials.

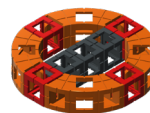
Determine the Volume of Rectangular Prisms and Cylinders

Fill out the correct information in the spaces provided.

 4. **Volume** of entire **rectangular prism**: _____ cm³

 5. **Volume** of interior **rectangular prism**: _____ cm³

 Rectangular
Prism

 6. **Volume** of entire **cylinder**: _____ cm³

 7. **Volume** of interior **cylinder**: _____ cm³


Cylinder

Design & Engineering Challenge

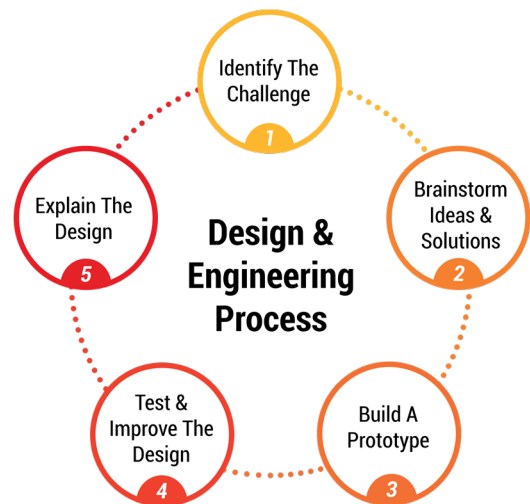
Follow each step in the design & engineering process to develop a solution to the challenge. Place a check in each box as each step is completed. Fill in the blanks when necessary.

1. Identify The Challenge

Challenge: _____

2. Brainstorm Ideas & Solutions

- Discuss design ideas.
- Consider building components.
- Sketch out design ideas on paper.
- Choose the best design.



3. Build A Prototype

Use Kid Spark engineering materials to build a prototype.

4. Test & Improve The Design

- Look for opportunities to improve the design. (Is it practical, proportional, etc..)
- Review challenge specifications/criteria and grading rubric.

5. Explain The Design

- Determine the specifications of the design that was created. *Student Engineering Workbook - Page 3*
- Discuss the following items with your team and be prepared to share with the rest of the class.

- a. How did the team arrive at the final design solution? Discuss how each step in the Design & Engineering process was used to develop the design.
- b. Is the design realistic and well-proportioned? Which end of the pool has a larger volume? Why did the team decide to configure the design of the pool in this way?
- c. How did each team member contribute towards the overall design? Do you feel like everyone had an equal opportunity to contribute in the creative process?
- d. Is the team prepared to share detailed specifications of the design to others?





Design Specifications

Use the space provided to determine the total interior volume of the swimming pool.

<div style="background-color: #444; color: white; padding: 5px; font-weight: bold; text-align: center;">Shallow End</div> <p style="text-align: right;">Interior volume: _____ cm³</p>	<div style="background-color: #444; color: white; padding: 5px; font-weight: bold; text-align: center;">Deep End</div> <p style="text-align: right;">Interior volume: _____ cm³</p>	<div style="background-color: #444; color: white; padding: 5px; font-weight: bold; text-align: center;">Total Interior Volume</div> <p style="text-align: right;">Interior volume: _____ cm³</p>
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Challenge Evaluation

When teams have completed the design & engineering challenge, it should be presented to the teacher and classmates for evaluation. Teams will be graded on the following criteria:

-  **Specifications:** Does the design meet all specifications as stated in the design brief?
-  **Team Collaboration:** How well did the team work together? Can each student describe how they contributed?
-  **Design Quality/Aesthetics:** Is the design of high quality? Is it structurally strong, attractive, and well proportioned?
-  **Presentation:** How well did the team communicate all aspects of the design to others?

Grading Rubric	Advanced 5 Points	Proficient 4 Points	Partially Proficient 3 Points	Not Proficient 0 Points
Specifications	<input type="checkbox"/> Meets all specifications	<input type="checkbox"/> Meets most specifications	<input type="checkbox"/> Meets some specifications	<input type="checkbox"/> Does not meet specifications
Team Collaboration	<input type="checkbox"/> Every member of team contributed	<input type="checkbox"/> Most members of team contributed	<input type="checkbox"/> Some members of team contributed	<input type="checkbox"/> Team did not work together
Design Quality/ Aesthetics	<input type="checkbox"/> Great design/ aesthetics	<input type="checkbox"/> Good design/ aesthetics	<input type="checkbox"/> Average design/ aesthetics	<input type="checkbox"/> Poor design/ aesthetics
Presentation	<input type="checkbox"/> Great presentation/ well explained	<input type="checkbox"/> Good presentation/ well explained	<input type="checkbox"/> Poor presentation/ explanation	<input type="checkbox"/> No presentation/ explanation
Points
Total Points /20			