**Challenge: Football Soccer**

**The Rules**: You must design and build a robot that can move foam footballs and foam balls from one side of the arena to the other by pushing them through an opening in the dividing wall or passing them over the dividing wall. There will be two teams competing in a head-to-head competition, the team with the most balls on their side at the end of a 2 minute round loses. Any balls that end up outside the arena will be counted in the total for the team that got them out.

You will be using the **Engineering Design Process** to complete your task:

**Engineering Design Process**

* 1. Identify the Problem
* 2. Gather Information
* 3. Develop a Design
* 4. Construct and Test the Design
* 5. Redesign and Rebuild
* 6. Attempt the Goal and Evaluate

1. **Identify the Problem:** The first step in the **Engineering Design Process** is to identify the problem. This includes identifying any criteria ( requirements) and constraints (limitations).

**Problem:**

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| **Criteria** | **Constraints** |
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1. **Gather Information:** The next step in the **Engineering Design Process** is to gather information and consider ideas.

Make a list of key features that will help your robot succeed.

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Make a list of the parts you would like to use.

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1. **Develop a Plan:** The next step in the **Engineering Design Process** is to develop a plan. You will create a detailed, labeled sketch of your design.
   1. To help generate ideas each team member will develop a design independently.
   2. The group will then discuss each design and decide upon a group design.
   3. Sketch out a detailed, labeled diagram of the groups design you intend to build.
   4. Label all of the parts and determine the budget for the design.

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| **Develop your individual design.** |

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| **Draw and label the group tech drawing. (2-3 views)** |

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| **Item Description** | **Quantity** |
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1. **Construct and Test the Design:** The next step in the **Engineering Design Process** is to purchase your supplies, construct you design, and test it.

Evaluate the effectiveness of your design. What worked, what didn’t, what could be improved.

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1. **Redesign and Rebuild:** In this step you will redesign your contraption to improve those items that didn’t work well. This is a normal part of the **Engineering Design Process**. If your contraption worked properly the first time then redesign it to be less expensive yet still as effective.

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| **Draw and label your redesigned diagram.** |

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| **Modification Made** | **Reasoning** |
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1. **Attempt the Goal and Evaluate:** The final step in the **Engineering Design Process** is to attempt your solution to the initial problem and evaluate your final results.
   1. Did your design succeed? \_\_\_\_\_\_\_\_\_\_\_
   2. What about your design led to this outcome?

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* 1. Explain what you found difficult about designing and building your robot.

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* 1. Explain what you did to overcome these difficulties.

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* 1. What other materials or designs would you try if you had another opportunity?

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