BUILD CERTIFICATION

Robot Terminology

CATALOG: K11

OBJECTIVE

Team members will understand the application and importance of all the required parts on the robot.

COMPLETION REQUIREMENTS

All Mechanical, Electrical, and CAD members are required to complete this certification.

TERMINOLOGY INTRODUCTION

Trainer Qualifications

Mechanical Lead, Electrical Lead, and Mentors with relevant experience are able to administer this certification.

Major Assignment

- Demonstrate understanding of effective robot terminology
- Apply terminology to a given robotics scenario

Location

N/A

Materials

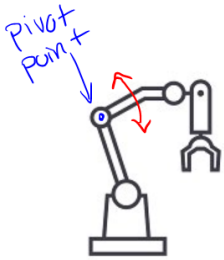
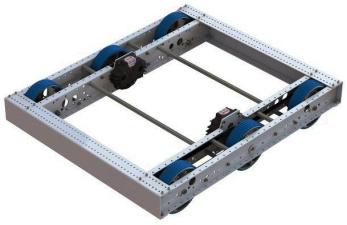
Robot Terminology Certification

FRC Team 4085 Certification
2025 - 2026 Season

TERMINOLOGY

Terminology is crucial for effective communication and collaboration among team members, especially across different subteams like mechanical, electrical, and programming. Effective terminology involves fully understanding what and the use of each item is and the benefits of it on the robot

On The Robot:

Term	Definition	Image
Swerve Drive	A type of drivetrain that allows for independent steering and driving of each wheel, providing high maneuverability.	
Pivot	A point around which a mechanism or component rotates.	
Drivetrain	The system responsible for propelling the robot, including motors, wheels, and transmission components.	

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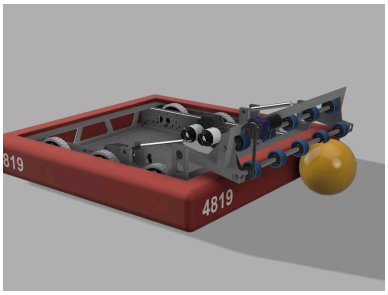
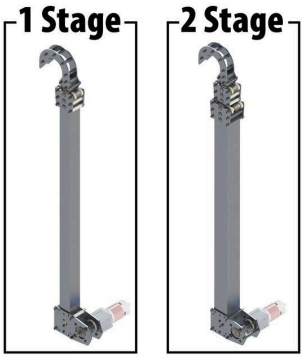
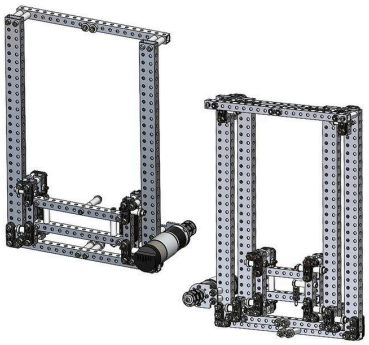
Gear Ratio	The ratio of the number of teeth on two gears that are meshed or two pulleys connected with a belt or chain, affecting the speed and torque output of the mechanism.	
Intake	A mechanism used to collect game pieces or manipulate objects.	
Lift Mechanism	A mechanism used to raise or lower game pieces or the robot itself.	
Elevator	A mechanism consisting of stages or levels that can move independently to lift game pieces to different heights.	

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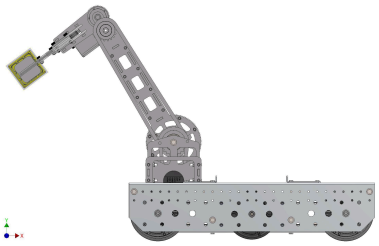
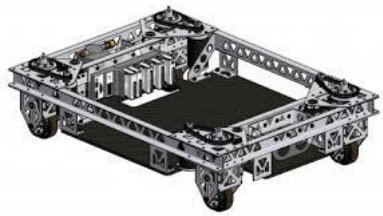
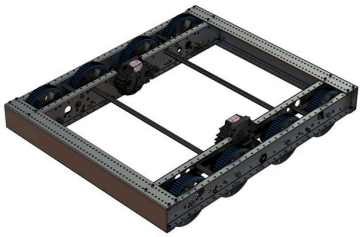
Arm	A manipulator mechanism resembling a human arm used to reach, grab, or manipulate game pieces.	
Limit Switch	A sensor used to detect physical limits of motion and prevent mechanisms from overextending.	
Chassis	The framework of the robot that supports and houses all other components.	 450 × 270
Frame	The structure that surrounds and protects the internal components of the robot.	

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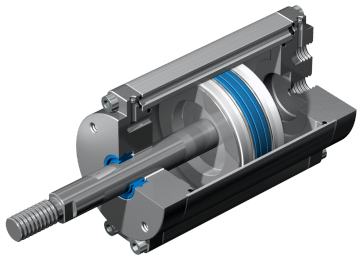
Pneumatics	The use of compressed air to power mechanisms or actuate components.	
Piston	A mechanical device that uses compressed air to move a rod in and out. (creates mechanical motion)	

Prototyping Learning Scenario: Building a Robot for a Robotics Competition

Scenario Introduction:
You are part of a robotics team preparing for an upcoming competition. Your team's task is to design, build, and test a robot capable of completing a series of challenges, such as navigating a maze, picking up objects, and placing them in designated areas. Your goal is to create an effective prototype that can be refined and improved throughout the design cycle.

Step 1: Initial Concept Phase
Question: It's time to start brainstorming ideas for your robot. What's your first step?

A. Gather the team for a brainstorming session to generate a wide range of ideas.
B. Conduct a detailed market analysis of existing robots.
C. Immediately start building a prototype using available materials.
D. Create a detailed project timeline and budget before generating any ideas.

Explanation: The first step in the Initial Concept Phase is to gather the team for a brainstorming session to generate a wide range of ideas. This helps in exploring various possibilities and identifying potential solutions.

Step 2: Detailed Design Phase
Question: You have several promising ideas from the brainstorming session. What should you do next?

A. Begin rapid prototyping each idea to see which one works best.
B. Develop detailed sketches and CAD models for the most promising ideas.
C. Purchase all the necessary components for all the ideas.
D. Conduct a user survey to gather feedback on the initial concepts.

Explanation: The next step is to develop detailed sketches and CAD models for the most promising ideas. This allows you to specify the design and plan the next steps in more detail.

Step 3: Building Prototypes Phase
Question: With your detailed designs ready, it's time to build a prototype. What is your next step?

A. Start by creating a final, polished version of your robot.
B. Use rapid prototyping techniques like 3D printing to quickly create a physical model.
C. Conduct a final review meeting to approve the designs.
D. Develop a marketing plan for the robot.

Explanation: In the Building Prototypes Phase, the focus should be on using rapid prototyping techniques like 3D printing to quickly create a physical model that can be tested and evaluated.

Step 4: Testing and Evaluation Phase
Question: Your prototype is ready. How should you proceed with testing and evaluation?

A. Immediately start working on the next version of the prototype without testing.
B. Test the prototype to ensure it performs as expected and gather user feedback.
C. Showcase the prototype to potential investors and sponsors.
D. Disassemble the prototype to reuse parts for other projects.

Explanation: The correct next step is to test the prototype to ensure it performs as expected in various scenarios and gather user feedback. This helps in identifying strengths and weaknesses and making necessary adjustments.

Step 5: Finalization Phase

Question: After iterative testing and refinement, you have a well-functioning prototype. What should be your next step?

A. Discard the prototype and start over with a new design.
B. Make final adjustments based on the last round of testing and feedback.
C. Conduct a detailed cost analysis before making any changes.
D. Publish a research paper on your design process.

Explanation: The final step involves making final adjustments based on the last round of testing and feedback, ensuring that the prototype is optimized and ready for production or implementation.