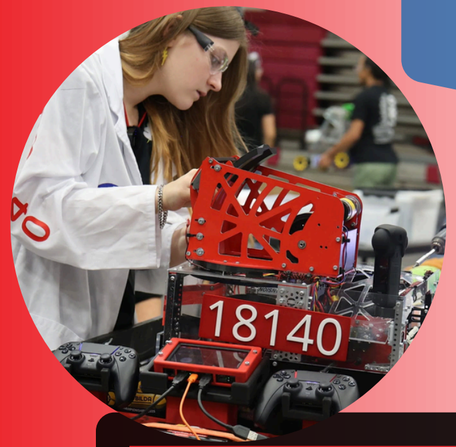
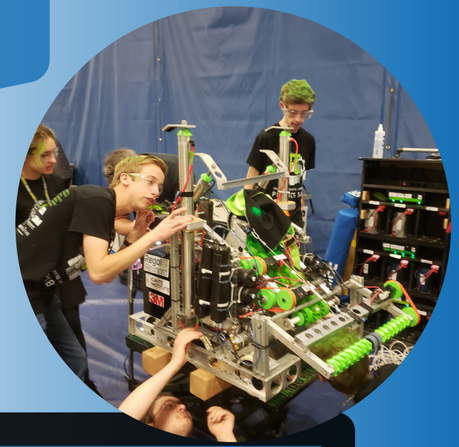
Learning Through *FIRST*

Preparing Kentucky students with career-ready technical, team-work, and problem solving skills.

FIRST Programs





FIRST Technical Challenge

Grades: 6th - 12th

Robot: Smaller Scale Robots

Season: September - April

FIRST Robotics Competition

Grades: 9th - 12th

Robot: Industrial-Sized Robots

Season: January - April

(although off season events are all year round)

FIRST in Kentucky

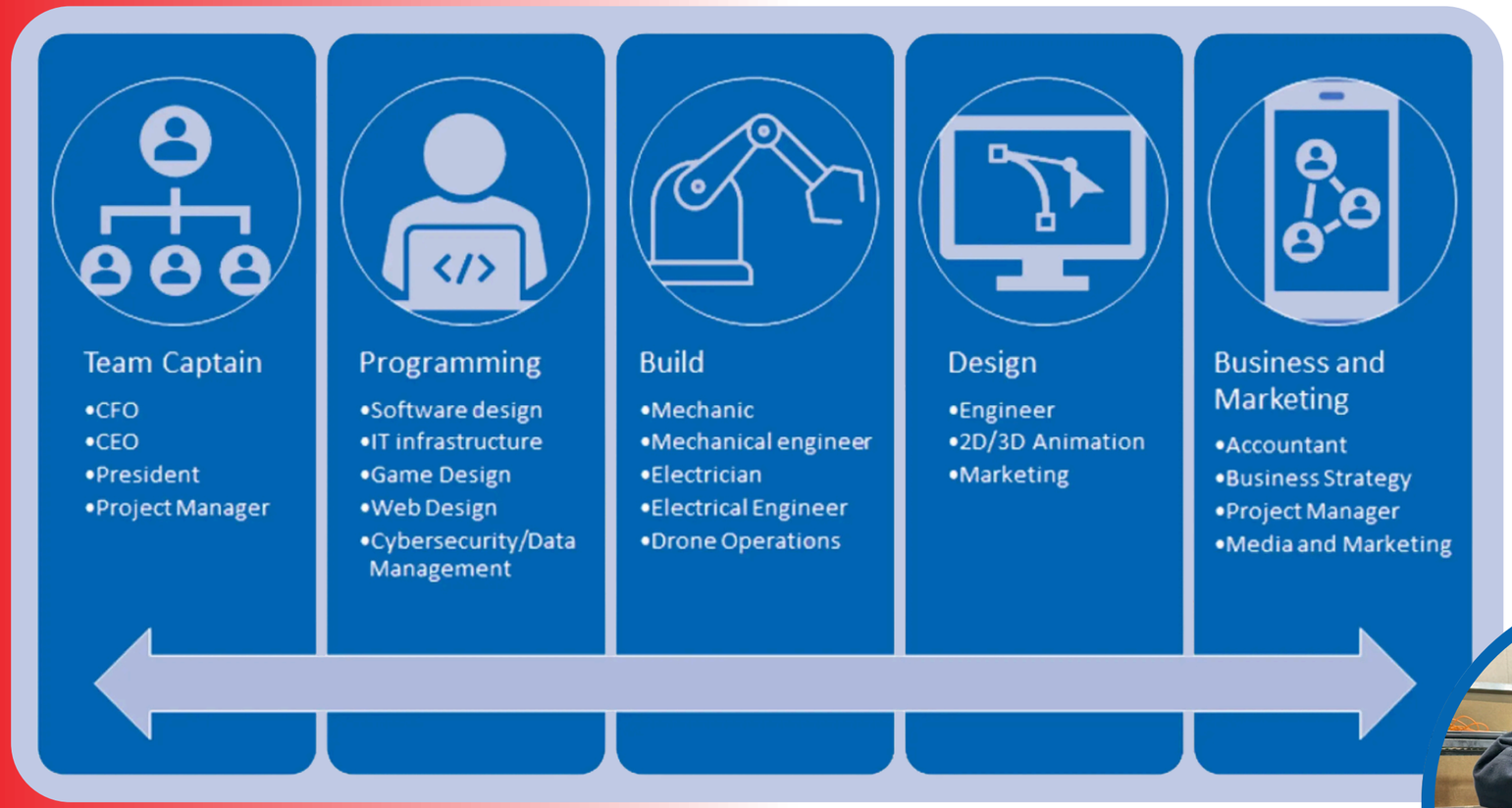
FIRST TECH CHALLENGE

47	Teams in Kentucky
500+	Students Participating

FIRST ROBOTICS COMPETITION

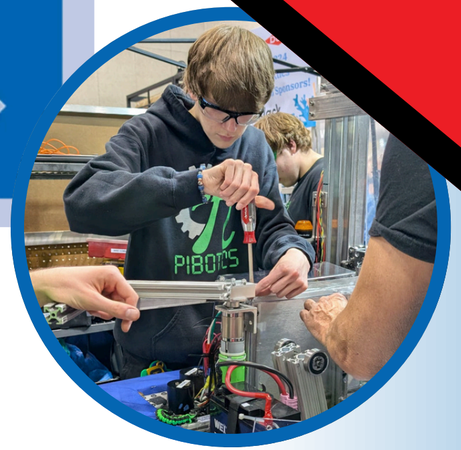
12	Teams in KY
100+	Students participating

Workforce Skills



Graphic from *FIRST* webside

Skills learned from *FIRST* robotics directly correlates to positions and skills in the workforce



Inspiring Advanced Manufacturing Careers in *FIRST*

“My passion for engineering and robotics was sparked in the FIRST Robotics Competition.”

- Rebecca Gilligan – A mechanical/ aerospace engineer and Kentucky FIRST alumni

Business and Leadership Development

Marketing and Outreach

Engineering and Design

Manufacturing

Robotics Manufacturing

Computer Science and IT

Certifications

- OSHA: 10 Hour Safety Training
- Autodesk: Certified Associate in CAM for 2.5 Axis Milling
- Haas: Basic Mill Operator, Basic Lathe Operator,
- Mastercam: 2D Mill, 3D Mill, Lathe, Multiaxis, and Core
- SME: Lean Bronze Certification (Foundational for Lean practitioners)
- SME Additive Manufacturing Fundamentals Certification
- MSSC: Certified Production Technician (CPT) 4.0 (Covers Safety, Quality, Processes, and Maintenance)

Our work-based learning toolkits provide learning pathways for guiding students in these certifications.

FIRST Tech Challenge WBL Toolkit

FIRST Robotics Competition WBL Toolkit

LEARNING RESOURCES AND OBJECTIVES	
Safety Manual; Safety Training Suggested Tools Common Hardware	**Execute** professional workshop safety standards with a focus on **Personal Protective Equipment (PPE)**. Maintain a professional safe environment while utilizing hand and power tools for subsystem fabrication.
Game and Season Technical Resources Manufacturing Worksheet	**Analyze** game-specific scoring elements to identify necessary manipulator functions. Use seasonal build guides to architect subsystems that meet specific criteria and constraints.
Game Piece Intakes Presentation	**Evaluate** various intake architectures. Analyze mechanical advantage and grip patterns to design a system that maximizes game-piece acquisition speed and reliability.
Indexers Presentation	**Evaluate** various indexing architectures. Analyze transition patterns to design a system that maximizes game-piece storage and organization.
Launchers and Placers Presentation	**Research** and test different mechanisms for launching and placing game objects. Apply engineering principles to optimize trajectory, precision, and release timing.
Actuators	**Categorize** and select appropriate actuators (brushed motors, brushless motors, or pneumatics) for specific robotic mechanisms by evaluating their mechanical properties, such as rotational vs. linear motion, torque-to-speed ratios, and system complexity.
Extenders	**Evaluate** and differentiate between various robotic extension mechanisms—including single/multi-stage elevators, telescoping arms, and linkages—to select the optimal design based on specific game requirements such as reach, height limits, and center of mass.
Prototyping 101 Prototyping Worksheet Mechanisms Worksheet	**Execute** an iterative prototyping process by moving from low-fidelity mock-ups (Level 0) to high-fidelity functional models (Level 2), using **quantitative data collection** to validate whether a mechanism meets specific game strategy requirements.
Haas Manufacturing Haas Certification	**Safely** operate CNC and manual machining tools to produce high-precision robot components by translating CAD designs into physical parts through proper tool selection, feed and speed calculations, and quality control inspections.
Onshape for Robotics CAD Resources Mechanical Engineering Joints	**Master** Computer-Aided Design (CAD) for subsystem modeling. Use assemblies and digital collaboration to ensure seamless integration between the manipulator and the chassis.
FRC Guided Experience	**Utilize** lessons within the *FIRST* Robotics Competition Guided Experience to take a deeper dive into executing your team and robot implementations.

More Than Robots

Outreach

- Fundrasing for teams
- Raising STEAM awareness
- Building a FIRST community
- Inspiring younger generations
- Helping other teams local and international

Business

- Branding
- Marketing during events
- Social media presence
- Website/App Design
- Accounting/ Finances

Achievements After High School

PROVEN STEM OUTCOMES

From local classrooms to international competitions, *FIRST* transforms education and inspires the next generation of leaders. These results from the *FIRST* Longitudinal Study show the depth of our impact:

83% of ***FIRST* alumni pursue STEM majors** by year four of college

51% of **female *FIRST* alumni declare a major in engineering or computer science** by year four of college

63% of ***FIRST* alumni are currently employed in a STEM field**

$62,000 is the **average salary of early career female *FIRST* alumni**, compared with a $43,000 peer average

***FIRST* Website - 2025, FIRST Annual Report**

FIRST Alumni

By their fourth year of college, *FIRST* alumni are more likely to be majoring in STEM fields than comparison group peers.

DECLARE A MAJOR IN STEM (SCIENCE, TECHNOLOGY, ENGINEERING, AND MATH)

FIRST ALUMNI 81%

COMPARISON GROUP 64%

DECLARE A MAJOR IN ENGINEERING OR COMPUTER SCIENCE

FIRST ALUMNI 59%

COMPARISON GROUP 24%

Women in *FIRST*

Young women in *FIRST* have significant gains in all STEM areas including STEM interest, career interest, activity, knowledge, and identity compared to young women in the comparison group.

DECLARE A MAJOR IN ENGINEERING OR COMPUTER SCIENCE

FEMALE*FIRST* ALUMNI 48%

FEMALECOMPARISON GROUP 16%

MORE LIKELY TO TAKE COURSES IN ENGINEERING OR COMPUTER SCIENCE

3.5x 2.5x

"x" = times as likely

***FIRST* Website - 2023, Research shows *FIRST* drives STEM engagement and outcomes**


WELCOME TO
FIRST
A GLOBAL ROBOTICS COMMUNITY PREPARING YOUNG PEOPLE FOR THE FUTURE

Thank You!