



# Oregon Robotics Tournament and Outreach Program

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## Vex Briefing

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2006

*Opening doors to the worlds of science  
and technology for Oregon's youth*



# Instructor Contacts

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# Today's Goal

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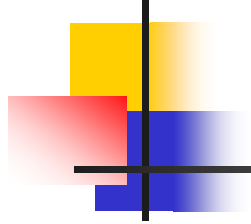
- Provide an understanding of the ORTOP and Vex programs
- Show the value these programs bring to our young adults
- Demonstrate the fun and excitement the programs generate
- Explain the opportunities for your involvement



# Agenda

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- Introductions
- Overview
- The ORTOP Tradition
- The ORTOP Vex Pilot Program
- Live Vex robotics demo



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# Introductions



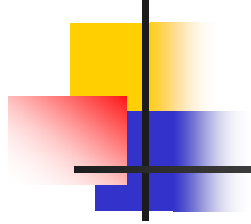
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# Overview

# ORTOP Vex Pilot Program

- Goals: Anchored in the ORTOP FLL Tradition
- Target audience: Late Middle School and High School
- Hardware:
  - Vex kit: Similar to an Erector set with a controller, RC, motors, and sensors
  - Arena: 12 x 12 foot playing field
- Cost: estimate \$700 - \$1850
- Timeline:
  - Enroll pilot teams: 16 max
  - March 17 regional
  - April 12 National
- Competition: RC, autonomous, and engineering notebooks





# The ORTOP FLL Tradition





# The Problem

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- The local economy has created a large number of technology jobs
- Number of our young people interested in technology growing too slowly especially among our young women and minority groups



# The Root Causes

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- Technology perceived as hard -- only for “geniuses”
- Media portrays Technologists as “nerds”
  - Poor communication skills
  - Overly serious/isolated
- Young people know very little about technical careers
  - Few/No engineering courses in K-12
  - Few/No role models available
- The reality is hard for them to visualize



# The Reality

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- We are regular people with a variety of personal characteristics
- Teamwork rather than isolation is mandatory for success
- We work on important, real-world problems to produce:
  - Consumer products
  - Medical solutions
  - Buildings & bridges
  - Nanotechnology is the theme for 2006
- Great potential for salaries/benefits



# The Opportunity -- FLL

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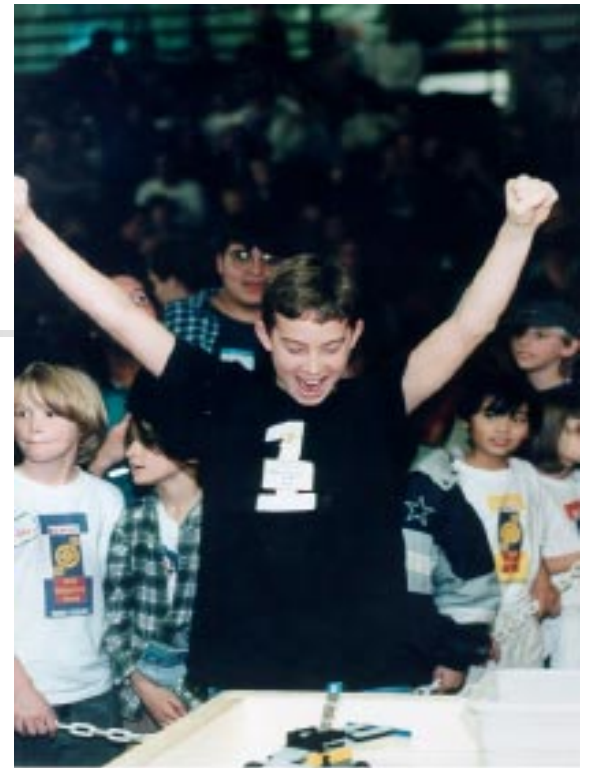
- Program from FIRST (For Inspiration and Recognition of Science and Technology)
  - FLL (FIRST Lego League) targets 9-14 year olds
  - Uses relatively inexpensive Lego robotics kits
  - Defines a mini engineering project based on real-world problems
  - Features hands-on experience and multi-disciplinary teamwork
- Show these youth engineering can be fun



# FIRST Philosophy

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”[We] share the philosophy that children learn best by doing hands-on, minds-on activities which challenge their intellect and creativity. The FLL program accomplishes this task in a healthy environment and shows kids that they can succeed where they may have never thought they could.” Dean Kamen, FIRST Founder





# ORTOP (Oregon Robotics Tournament and Outreach Program)

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*Opening doors to the worlds of science  
and technology for Oregon's youth*

- Runs the FLL program in Oregon and the surrounding counties
- Connected to the Chancellor's Office of the Oregon University System
- Heavily volunteer based



# Additional ORTOP Focus

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- Reach out to girls and minorities
  - Look for partners that can help: Girl Scouts, Boys and Girls Clubs, 4H, etc.
  - Special outreach to schools and community organizations with the demographics that fit our focus
- Every team that registers gets to participate
- Success for a team is participation



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# The ORTOP Vex Pilot Program

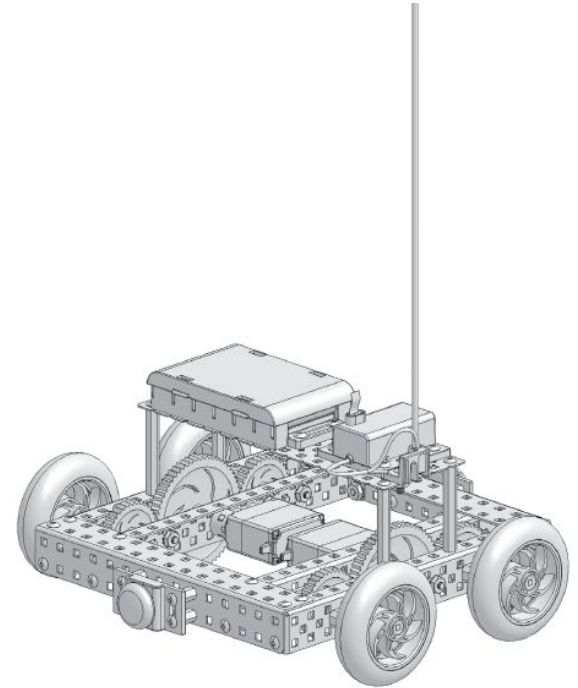




# Section Outline

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- Why First Vex Challenge
- Last year's challenge
- Teams
- Cost
- Timeline
- Vex kit and competition arena
- Tournament Structure and Judging
- Links and resources



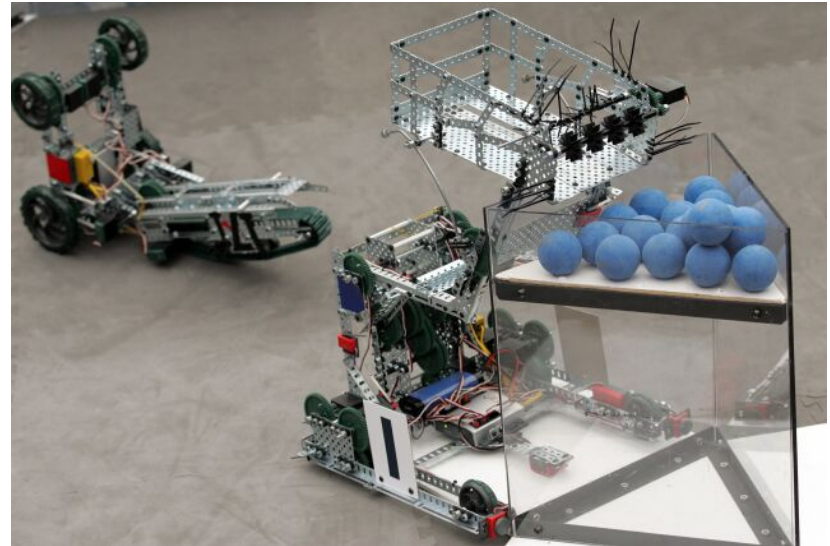
# First Vex Challenge (FVC)

- More accessible, affordable *FIRST* experience
- Creates bridge between FLL and FRC

FLL: First Lego League

FRC: First Robotics Challenge

- Teams of middle/high-school students:
  - Design and build robots using Vex Robotics Design System
  - Create and test innovative designs
  - Explore robotics concepts





# Target Range for First Programs

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*FIRST* Robotics Competition

*FIRST* Vex Challenge

*FIRST* LEGO League

Junior  
*FIRST* LEGO League

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K 1 2 3 4 5 6 7 8 9 10 11 12

Grade Level



# FVC 2005/06 National Experience

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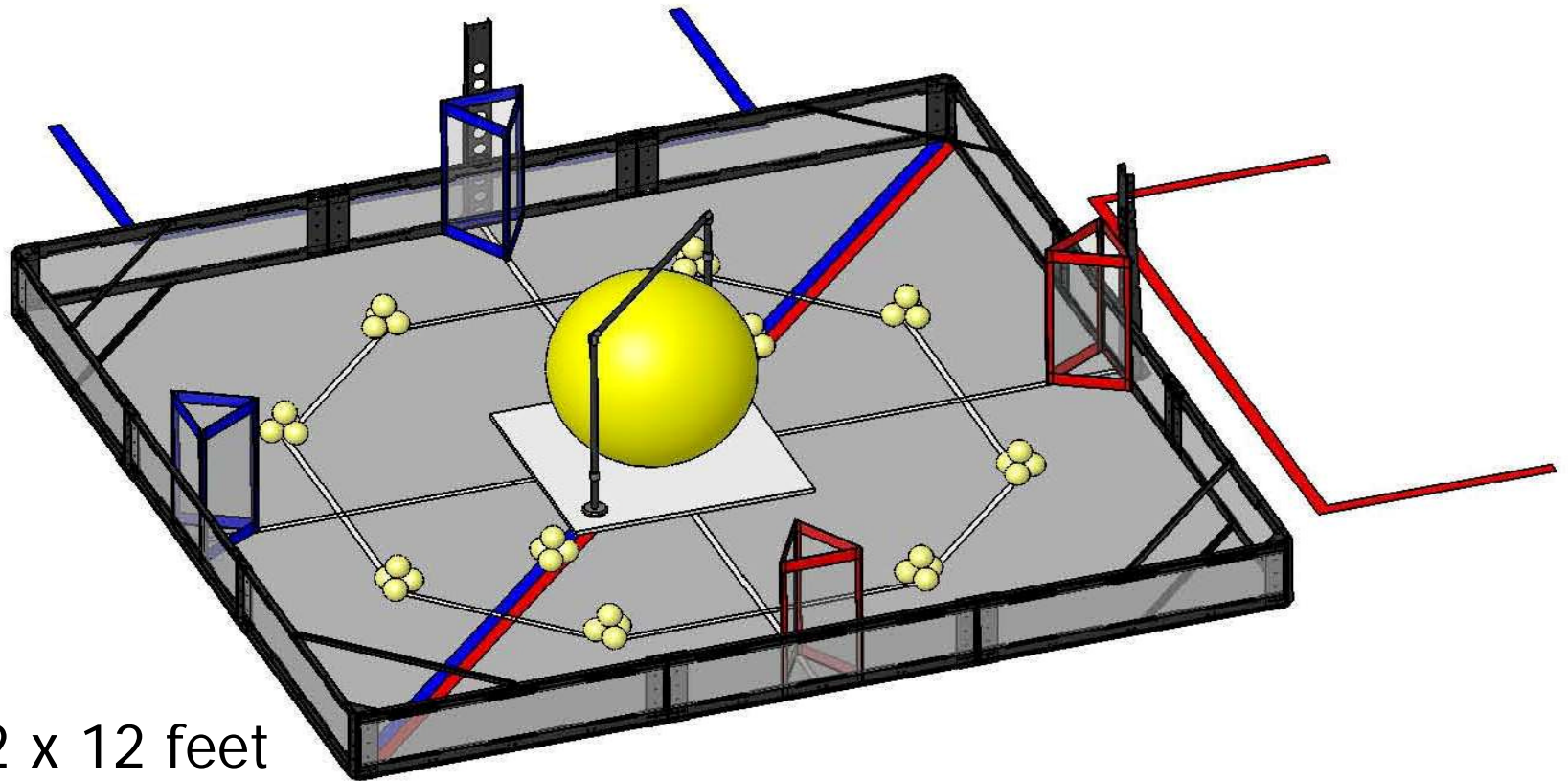
- 130 teams
- 1,300 high-school-age students
- 31 states represented
- 6 events
- pilot season was a success leading to an extension to this year.

# ORTOP Goals for FVC

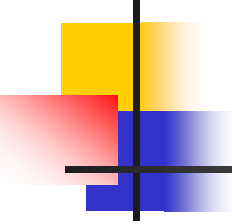
- Extend the FLL outreach program to support more advanced and older students and FLL graduates.
- Build on the Strengths of FLL
- Explore new opportunities:  
i.e. this is a pilot Program



# This Year's Arena



12 x 12 feet



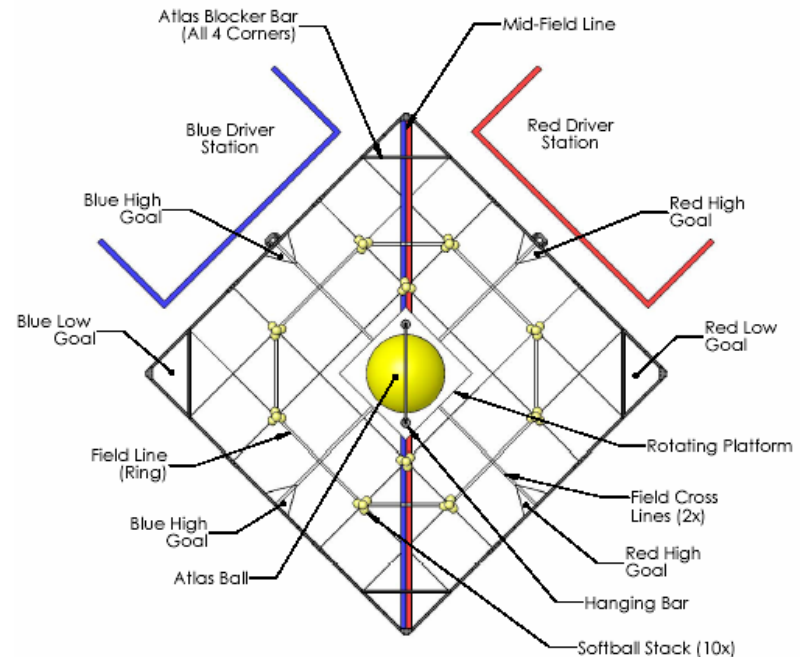
# This Year's Operator-controlled Matches (Hangin'-A-Round)

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- 2-minute matches
- Two-team alliances – red and blue
- Scored by placing softballs into colored
  - High goals (3 points)
  - Low goals (1 point)
- Scored by having robots at match end:
  - Hanging (15 points) or
  - Parked (5 points)
- Possessing the Atlas ball doubles softballs

# Last Year's Autonomous Matches

- 20 second matches
- Alliance with more total softballs (10 point bonus)
- Possessing the Atlas ball doubles softballs





# What Is a Vex Team?

- Up to 10 teens each
- Late middle school through high school
- At least one adult
  - Coach – team responsibility
  - Mentor – technical expertise
- Sources of teams
  - Schools
  - Community groups
  - Neighborhoods



# The Team Experience

- Miniature engineering project team stressing
  - Creativity and teamwork
  - Engineering principles: requirements, alternatives, rapid prototyping, testing, ...
- Hands-on problem solving
- Context is a real-world situation
- Illustrates multiple roles: Designers, Builders, Programmers
- Insights into possible careers
- The youngsters do the work – Coaches' Honor Code and Team Promise





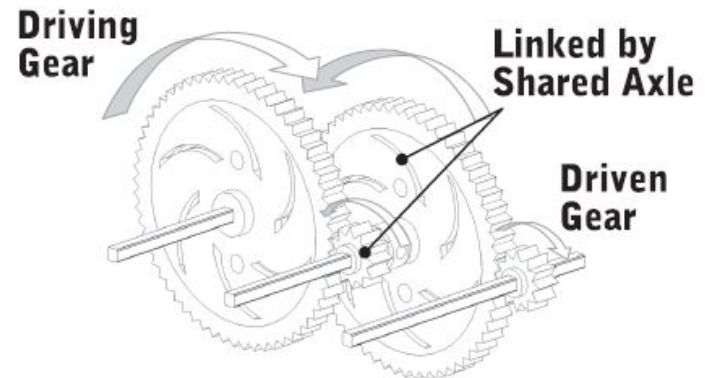
# The Team Timeline

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- 2006 Season Kickoff is September 13
- Vex bundle is available late September
- ORTOP Vex workshop in late September
- Teams register in Fall
- Teams develop their solutions for:
  - The real learning in the program
  - Robot design, programming, and presentation
- Culminating events
  - Regional tournament: Portland – March 17, 2007
  - National tournament: Atlanta - April 12-14, 2007

# 3 Step Registration

- Reserve a spot with ORTOP
- Register with FVC
- Finalize ORTOP registration
  - Your spot expires after 2 weeks if not finalized

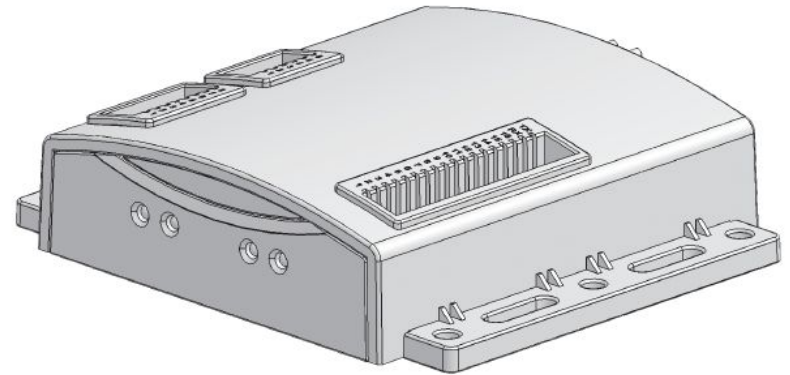


# The Vex robotics kit

- The Robots maximum dimensions at start for last year's challenge: 18" W x 18" L x 18" H
- FVC bundle kit (at registration): \$375
  - Vex Starter Kit (\$299.99 value)
  - Additional Vex Transmitter and Receiver Kit (\$129.99 value)
  - Vex Custom Metal Kit (\$63.08 value)
  - Vex Robotics Programming Kit (\$99.99 value)
  - Vex Power Pack (\$49.99 value)
  - (4) Vex Safety Glasses (\$31.96 value)
- Developed by Innovation First and RadioShack
- Over 500 parts per kit



# Robot Control



- Autonomous
  - Programming kit required
- Remote control
  - Alternate frequencies for multiple robots to operate simultaneously

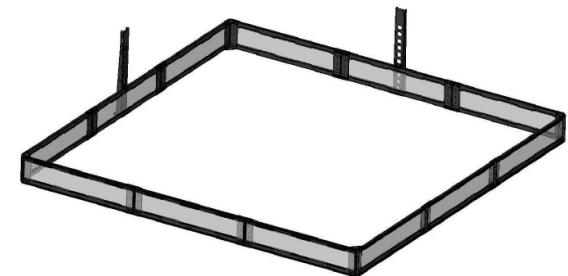
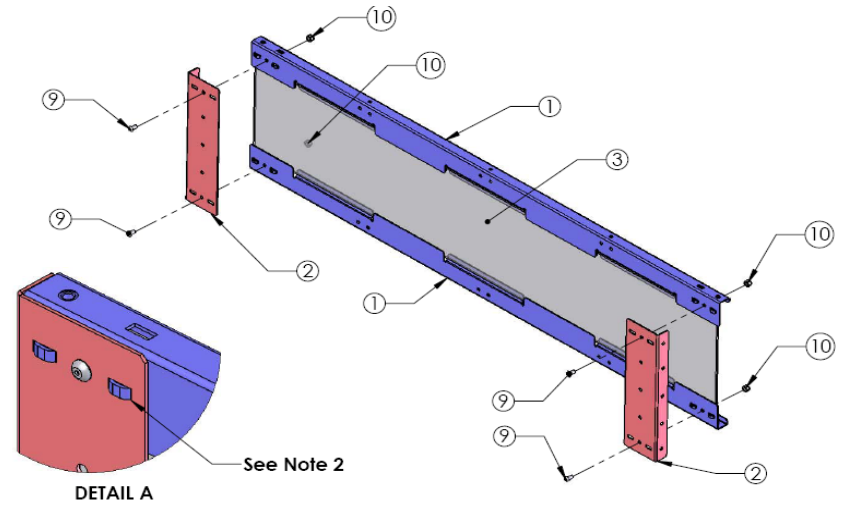


# Arena

- 12 x 12 feet
- Cost

- Official arena: \$1300
  - Field perimeter: \$530
  - Field controller: \$200
  - Foam field tiles: \$170
  - Challenge specific materials: \$400

- Non-official cheaper solutions
  - Field perimeter: \$130
  - Challenge specific materials: ?





# Vex Team Costs

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- Materials
  - Vex Robotics Bundle Kit: \$375
  - Misc. (batteries, building materials, shipping)
- Registrations
  - National Registration Fee: \$275
  - State Registration Fee: \$50
- Arena - optional
  - (\$200 to \$1300)
- Total: \$700 lower bound



# Tournament Structure \*

- Structured on FVC tournaments
- ORTOP Regional tournament
  - 16 teams max
  - March 17



\* Under development

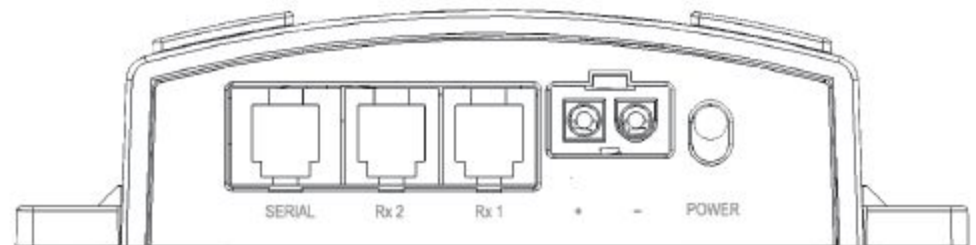
# Engineering Notebook

- It records the engineering design process
  - Obstacles faced, lessons learned, and sketches of ideas
- One notebook per team
- The real thing
  - Permanent ink with cross-outs
  - Not a high production showpiece

Task Column	Reflection Column
1 Move front wheels back a little.	Started up system, it runs, but slowly. Needs improvement - Reason
2 Wheels unstable and wobble - Add more support	still learning tank and arcade styles (NV)

# Judging\* - Showing What They've Learned

- Results of autonomous competition
- Results of remote control competition
- Engineering notebooks



\* Judging criteria is announced at the kickoff. We will probably tune to meet ORTOP goals

# Last Year's FVC Tournament Awards \*



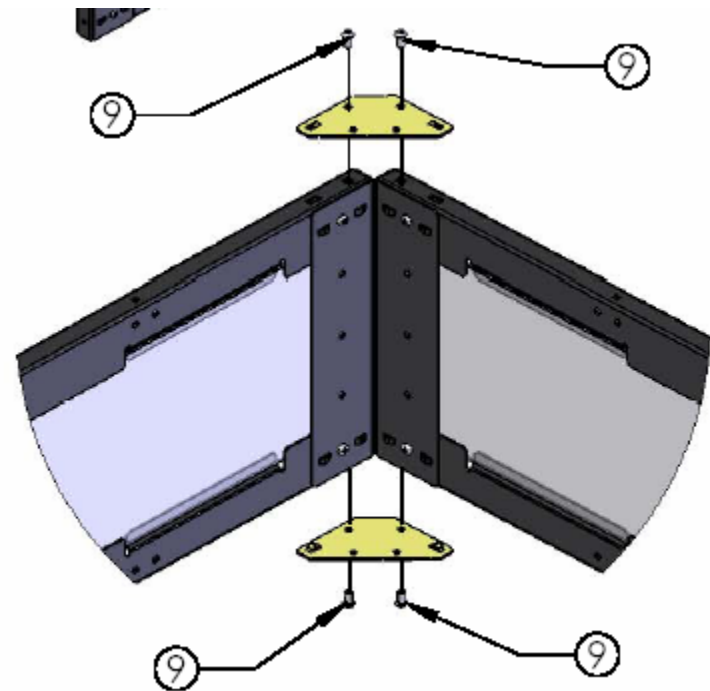
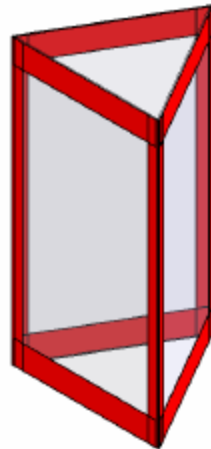
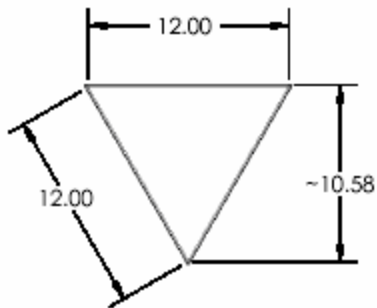
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- **FIRST Vex Challenge Inspire Award**  
Honors the team that performs well in all categories and is viewed by other teams as the most desirable alliance partner and by judges as best exemplifying all components of the FIRST Vex Challenge philosophy.
- **FIRST Vex Challenge Winning Alliance Award**  
Celebrates the winning alliance represented in the final match.
- **FIRST Vex Challenge Amaze Award**  
Gives judges the freedom to recognize the most remarkable team for which a standard award does not exist.
- **FIRST Vex Challenge Connect Award**  
Celebrates the team that receives the total highest points after the completion of the autonomous matches.
- **FIRST Vex Challenge Innovate Award**  
Celebrates the team that has the most innovative and creative robot design solution to the FIRST Vex Challenge and any specific field elements or components.
- **FIRST Vex Challenge Think Award**  
Celebrates the team whose Engineering Notebook best reflects the “journey” the team took as they experienced the engineering design process.

\* We will probably tune to meet ORTOP goals

# Our Sponsors

- IBM
- On Semiconductor
- ORTOP



# Volunteer Opportunities



- Coaches
- Mentors
- ORTOP Planning Committee
- Regional Tournament Planning
- Tournament Staffing
- Financial Support



# Our Mailing Lists

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- Totally voluntary, and you can opt out
- ortopvex
  - All interested parties
  - One way from ORTOP
  - We add you on request
- ortopvexcm
  - Coaches and mentors
  - Communication among that group and with ORTOP
  - We add you when you complete a workshop



# Next Steps

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- Sign-up for Vex workshop
  - [ortopreg@ortop.org](mailto:ortopreg@ortop.org)
- Register
  - Reserve slot with a message to [vex@ortop.org](mailto:vex@ortop.org)
  - Register with FIRST: Click on the registration link on <http://www.usfirst.org/vex/> -- \$275 fee
  - Finalize with ORTOP: Click on the registration link found on <http://ortop.org/vex.htm> -- \$50 fee





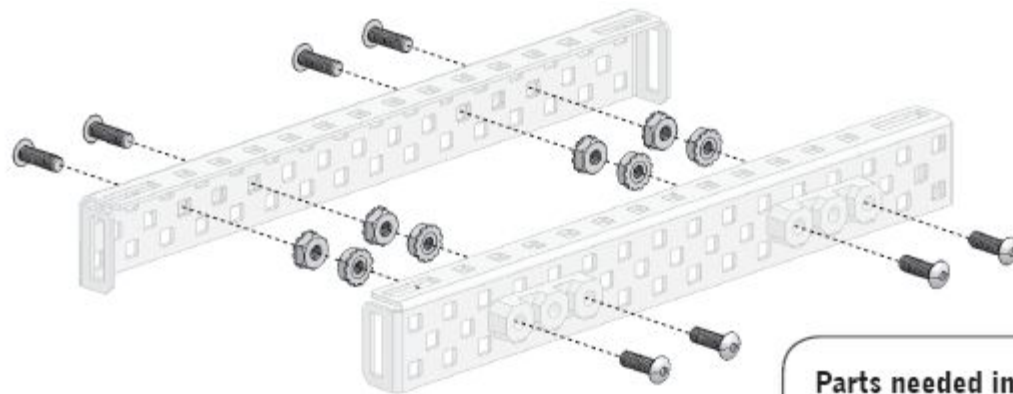
# Contact Us

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Web site: <http://www.ortop.org/vex.htm>

Email: [vex-questions@ortop.org](mailto:vex-questions@ortop.org)

Phone: 503-725-2920



**Parts needed in this step:**



# Links

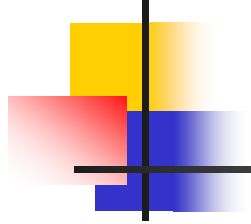
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- First – designs programs
  - Vex Challenge
    - <http://www.usfirst.org/community/fvc/>
  - Documentation
    - <http://www.usfirst.org/community/fvc/content.aspx?id=962>
  - Registration – see Innovation First
    - <http://www.usfirst.org/community/fvc/content.aspx?id=750>
- Innovation First - Supplier for First
  - Registration and Bundle Kit
    - <http://www.innovationfirst.com/fvc/confirm-registration.shtml>
- Vex Labs - Vex part of Innovation First
  - Vex parts
    - <http://www.vexlabs.com/>
  - Field parts
    - <http://www.vexlabs.com/vex-robotics-field-parts.shtml>



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# Questions Discussion



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# Demos