BEST Robotics,Inc.

Inspiring Future Generations of Engineers, Scientists and Technology Experts Since 1993

2010-2011

ANNUAL REPORT

National Headquarters   AUBURN UNIVERSITY

BEST™ **B**oosting **E**ngineering, **S**cience, and **T**echnology

The BEST Robotics, Inc. (BRI) Organization

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- BEST originated in 1993 when Ted Mahler and Steve Marum, both engineers with Texas Instruments in Sherman, TX, volunteered to organize and host a robotics competition for 14 high schools in rural Grayson County; 221 students participated.

What was supposed to be a one-time event... **has steadily grown to become the largest school-based robotics program in the U.S. and third largest among all U.S. robotics programs.**

1993 – Founders Steve Marum & Ted Mahler with 1st Game

- In 1998, BEST Robotics, Incorporated (BRI) was established as a Texas-registered 501(c)3, non-profit organization. In 2009, Auburn University (Auburn, AL) became the host of BRI's national headquarters.

- **BRI is a volunteer-run organization**, with over 7500 passionate and committed volunteers from across the U.S. annually serving in a variety of roles, including: game designers; board of directors members; national committee chairs and members; new hub recruiters; hub and regional event organizers, fundraisers, event personnel, and competition judges; and mentors for local BEST teams.

- BRI licenses the BEST Robotics program/competition to groups that formally apply to start "hubs" (competition sites) in their communities. Any group is eligible to apply, including, but not limited to the following: companies; K-12 school systems; community and technical colleges; four-year colleges and universities; professional engineering societies; and non-profit organizations. To be awarded a license, applicants must meet a number of requirements, most important of which is a sustainability plan.

- Licensees pay an annual $2000 license fee and are responsible for raising the necessary funds to run the hub and fund the annual fall program. In addition, licensees are responsible for developing their organization and recruiting both schools and volunteers.

Our Guiding Principles

- Students are the primary participants, decision-makers, designers, and builders

- BEST is open to all schools, regardless of type, size, location, or socioeconomic status

- BEST is open to all students; we do not limit the number of students per school that can participate

  - BEST charges no fees to schools or students to participate

  - All robotics equipment and construction materials are provided at no cost to participating schools

BEST

Boosting Engineering, Science, and Technology

The BEST Program

Hub Competition – Six Week Long Fall Program (September through October)

Robotics (Game) Division

- Annual games – educational themes based upon real-world engineering challenges
- Teams awarded points for successfully completing game-specific tasks and challenges
- Seeding Round – 3-minute matches, four teams per match; each team plays 5-8 matches
- Highest scoring teams advance to semi-final and final rounds
- Top 1-3 teams advance to BEST's Regional Robotics Championships
- **Robotics teams are also required to submit a** *Project Engineering Notebook*

The BEST Award Division

- Presented to the team that most embodies the concept of *"Boosting Engineering, Science and Technology"* through:

  Teamwork

  Diversity of Participation

  Sportsmanship

  Positive Attitude and Enthusiasm

  School/Community Involvement

  Creativity

  Application of the Engineering Design Process

- An additional competition available for schools

- Encourages school-wide participation of students with wide-ranging interests – photography, web design, cinematography, public speaking, creative writing, graphic design, art, and more

- In addition to participating in the Robotics Division, BEST Award teams compete in the following individual categories:

  Project Engineering Notebook

  Marketing Presentation

  Team "R&D" Exhibit

  Judges Interview

  Spirit & Sportsmanship

Founders Ted Mahler & Steve Marum
2011 BEST World Championship – Walt Disney World

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The BEST Program's Impact

"The BEST experience is like an education greenhouse; what happens during six weeks of competition would take an entire year in the classroom."

Dr. Mark Conner, Head,
The Engineering Academy
at Hoover High School (AL)

Student Impact

- Provides students with real-world engineering design experience
- Acclimates students to the rigor required for college-level STEM studies
- Helps students develop numerous skills and competencies:
    - Technological literacy skills (the practical application and appropriate use of technology)
    - Leadership, project management, teamwork, and organizational skills
    - Decision-making, critical-thinking, and problem-solving skills
    - Self-confidence and competence
    - Improved work habits and attitudes towards learning

Educational Impact

- Provides a hands-on, project-based learning experience and intellectual challenge that engages students in STEM learning
- Fosters collaborative relationships among teachers and breaks down academic "silos"
- Creates an engineering "culture" in schools and a foundation for establishing engineering programs, activities, clubs, and courses-of-study
- Satisfies state standards for Science and Technology Education

Local Workforce Development Impact

- Helps prepare students for entering the workforce by providing real-world business experience:
    - Budget, time, personnel, and materials constraints
    - Product design and construction
    - Project management
    - Research & development
    - Technical documentation
    - Business and marketing plans
- Establishes innovative, on-going relationships between industries and K-12 schools
- Provides opportunities to expose students to and recruit students for careers in local industries
- Establishes an on-going skilled and competent workforce "pipeline" for local industries

BEST™ Boosting Engineering, Science, and Technology

National Corporate Partner

In 2011, **MathWorks** became BEST Robotics' first-and-only National Corporate Partner through its generous funding support for the BEST Robotics organization. The company is the leading developer of mathematical computing software for engineers and scientists in the world. MathWorks equips BEST teams with software, training, and mentoring to tackle the same technical issues as professional engineers. Industry-standard **MATLAB®** and **Simulink®** provide a flexible design environment where BEST students can apply classroom theory to solve problems encountered in designing their robots.

**BEST** **B**oosting **E**ngineering, **S**cience, and **T**echnology

National Corporate Sponsors

In 2005, **igus**®, Inc. became BEST's first National Corporate Sponsor by donating its innovative polymer automated machinery parts to every BEST team for use in the design of their robots. The incorporation of these parts revolutionized the robotics competition by enabling students to design more innovative and efficient machines.

Since 2005, **SolidWorks**® has been providing their Student Edition CAD Design software free to all BEST students. Their BEST and VEX CAD models, curriculum, tutorials, and design tools have been invaluable in helping students understand the basics of robot design.
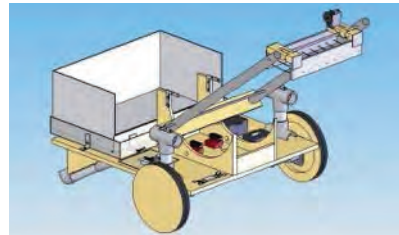
Intelitek, developers, producers and suppliers of industrial **Blended Learning** Technology Training Systems, provides its EasyC programming software for the VEX Cortex microcontroller free to all BEST teams and teachers. Designed with BEST students in mind, easyC's simple to use drag-and-drop programming interface does all of the syntax and spacing, allowing students to focus on program flow and robot design.

The Robotics Academy at Carnegie Mellon University provides its ROBOTC programmable software free to all BEST teams. ROBOTC is the premiere C-based robotics programming language for educational robotics and competitions. It is ideal for those students who want to go beyond simple drag-and-drop programming to writing their own code.

InspirTech provides each BEST team with its Student Edition 2011, a structured SolidWorks training course that guides students through the learning process with a unique and highly effective holistic approach to teaching that inspires confidence rather than confusing and frustrating students.
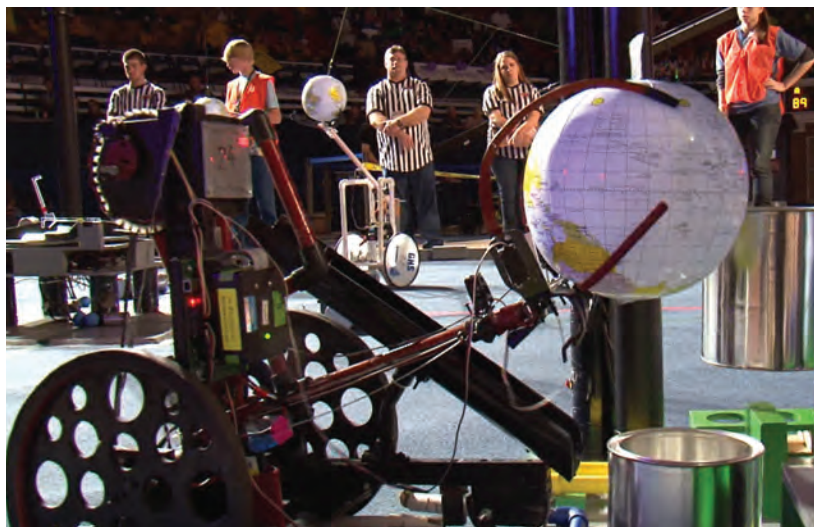
BEST™

Boosting **E**ngineering, **S**cience, and **T**echnology

2011 BEST Robotics, Inc. Leadership

Executive Director
George Blanks, Auburn University, Auburn, AL

Director of Operations
Greg Young, Freescale Semiconductor, Austin, TX

Board of Directors

Officers

President
Garry Ackerman, Raytheon Company, McKinney, TX

Vice-President
Larry Gewax, Texas Instruments, Dallas, TX

Secretary
Eric Heiselt, Mississippi State University, Starkville, MS

Treasurer
Velda Morris, School District of Philadelphia, Philadelphia, PA

Hub District Representatives

District 1 – *Arkansas, Kansas, Missouri, and Oklahoma hubs*
E.T. Hammerand, Arkansas State University, Jonesboro, AR

District 2 – *East and South Texas hubs*
Paul Lutes, Baker Hughes, Inc., Houston, TX

District 3 – *Central Texas hubs*
David Kwast, Lockheed Martin Aeronautics, Ft. Worth, TX

District 4 – *North and West Texas, New Mexico hubs*
Garry Ackerman, Raytheon Company, McKinney, TX

District 5 – *Southeast hubs*
Eric Heiselt, Mississippi State University, Starkville, MS

District 6 – *Colorado, Connecticut, North Dakota, and Pennsylvania hubs*
Velda Morris, School District of Philadelphia, Philadelphia, PA

Regional Contests Representative
Ken Berry, University of Texas at Dallas, Dallas, TX

At-Large Member
Larry Gewax, Texas Instruments, Dallas, TX

Board Committee Chairs

Awards and Judging Committee
Mary Lou Ewald, Auburn University, AL

Board Development Committee
Janne Ackerman, Raytheon Company, McKinney, TX

Game Committee
Greg Young, Freescale Semiconductor, Austin, TX

Kit Committee
Larry Gewax, Texas Instruments, Dallas, TX

| 2007 - 2011 Financial Statements				
	2007	**2008**	**2009**	**2010**	**2011**
Equity	104,456.39	120,568.26	161,010.60	201.689.62	200,085.60
Liabilities	-6,346.62	-7,178.76	-7,178.76	-6,342.55	-7,364.81
Assets	98,109.77	113,389.50	153,831.84	195,347.07	192,720.79
Total Assets	**98,109.77**	**113,389.50**	**153,831.84**	**195,347.07**	**192,720.79**

BEST Boosting Engineering, Science, and Technology

BEST Robotics, Inc.
Hubs and Regional Championships
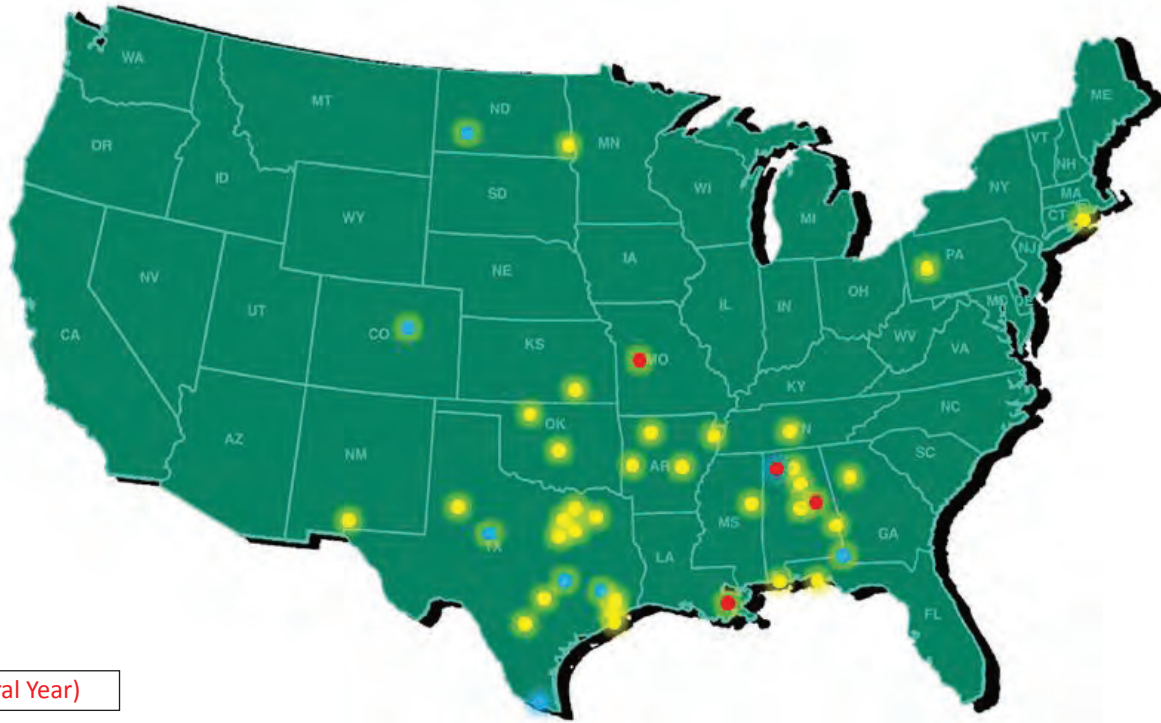
(Inaugural Year)

ALABAMA
  Blazer BEST (2008)
  University of Alabama at Birmingham
  Birmingham, AL

  Central Alabama BEST (New in 2011)
  Central Alabama Community College
  Talladega, AL

  Jubilee BEST (2004)
  Jubilee BEST Robotics, Inc.
  Mobile, AL

  North Alabama BEST (2009)
  Wallace State Community College
  Hanceville, AL

  Northwest Alabama BEST (New in 2011)
  Northwest Shoals Community College
  Muscle Shoals, AL

  Tennessee Valley BEST (2003)
  Calhoun Community College
  Decatur, AL

  War Eagle BEST (2001)
  Auburn University
  Auburn, AL

  Wiregrass BEST (New in 2010)
  Wiregrass BEST, Inc.
  Dothan, AL

ARKANSAS
  Crowley's Ridge BEST (2006)
  Arkansas State University
  Jonesboro, AR

  Little Rock BEST (2009)
  University of Arkansas at Little Rock
  Little Rock, AR

  Northark BEST (2006)
  North Arkansas College
  Harrison, AR

  River Valley BEST (2003)
  University of Arkansas - Fort Smith
  Fort Smith, AR

COLORADO
  Rocky Mountain BEST (New in 2010)
  Rocky Mountain BEST, Inc.
  Denver, CO

CONNECTICUT
  Connecticut BEST (2006)
  Central Connecticut State University
  New Britain, CT

FLORIDA
  Emerald Coast BEST (2007)
  University of West Florida
  Pensacola, FL

GEORGIA
  Georgia BEST (2003)
  Southern Polytechnic State University
  Marietta, GA

KANSAS
  Kansas BEST (1999)
  Wichita State University
  Wichita, KS

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LOUISIANA
 NOLA BEST (New in 2011)
Red Stick Robotics, Inc.
New Orleans, LA

MISSISSIPPI
 Mississippi BEST (2005)
Mississippi State University
Starkville, MS

MISSOURI
 Show Me BEST (New in 2011)
State Fair Community College
Sedalia, MO

NEW MEXICO
 New Mexico BEST (2001)
New Mexico State University at Las Cruces
Las Cruces, NM

NORTH DAKOTA
 Bison BEST (2007)
North Dakota State University
Fargo, ND

 Blue Hawk BEST (New in 2011)
Dickinson University
Dickinson, ND

OKLAHOMA
 Heartland BEST (2002)
Northwestern Oklahoma State University
Alva, OK

 Oklahoma BEST (1998)
Oklahoma Christian University
Oklahoma City, OK

PENNSYLVANIA
 Wolverine BEST (New in 2010)
Grove City College
Grove City, PA

TENNESSEE
 Music City BEST (2006)
Lipscomb University
Nashville, TN

TEXAS
 Big Country BEST (New in 2011)
Texas State Technical College - West Texas
Sweetwater, TX

 Capitol BEST (2001)
Capitol BEST, Inc.
Austin, TX

 Collin County BEST (1995)
Raytheon Company
McKinney, TX

 Cowtown BEST (2001)
Lockheed-Martin Aeronautics
Fort Worth, TX

 Dallas BEST (1996)
Texas Instruments
Dallas, TX

 Denton County BEST (1997)
University of North Texas
Denton, TX

 Galveston BEST (2009)
University of Texas - Medical Branch
Galveston, TX

 Heart of Texas BEST (New in 2010)
Texas State Technical College – Waco
Waco, TX

 Lion's Pride BEST (New in 2010)
Texas A&M University – Commerce
Commerce, TX

 North Houston BEST (1999)
Baker-Hughes, Inc.
The Woodlands, TX

North Texas BEST (1993)
Founding Hub
Texas Instruments
Sherman, TX

Rio Grande Valley BEST (New in 2011)
Texas State Technical College – Harlingen
Harlingen, TX

 San Antonio BEST (1994)
San Antonio BEST, Inc.
San Antonio, TX

 Southeast Texas BEST (New in 2011)
Sam Houston State University
Huntsville, TX

 Space City BEST (1999)
Space City BEST, Inc.
Houston, TX

 West Texas BEST (1995)
Texas Tech University
Lubbock, TX

REGIONAL CHAMPIONSHIPS
 Frontier Trails BEST (2005)
University of Arkansas - Fort Smith
Fort Smith, AR

 South's BEST (2003)
Auburn University
Auburn, AL

 Texas BEST (1994)
University of Texas at Dallas
Dallas, TX

BEST Robotics, Inc. licenses its robotics game and program to organizations vetted and approved by BEST's Board of Directors to operate a **BEST hub** (licensed program host). Any organization may apply. Contact BRI for more information.

BEST™ **B**oosting **E**ngineering, **S**cience, and **T**echnology

The Story Behind the 2011 Game, "BUGS!"

Educational Theme: Genetic Engineering

The Story Line

BEST Genetics scientists have been conducting research to determine if certain types of bugs – flies, termites, and cockroaches – can be genetically engineered to help eradicate certain diseases and eliminate various environmental toxins. To safeguard against introducing a new organism into the environment that could drastically affect human health and the surrounding ecosystem, the scientists have separated the genetically engineered bugs by type, with each having its own unique and controlled habitat, or "Containment Area."

Thousands of man-hours and significant capital have been invested in the research and the scientists are on the verge of achieving several major scientific breakthroughs. That is until yesterday, when the three containment areas failed and a large number of genetically engineered bugs escaped from the laboratory and found their way to a shed at a nearby construction site.

BEST Genetics is facing a potential environmental and public health disaster. It lacks the equipment needed to safely capture and transport the bugs back to the laboratory. To salvage their research, the scientists need at least one of each type of bug returned alive and once again segregated by type in separate containment areas; feeding the bugs is also a high priority.

BEST Team Challenge

BEST Genetics has asked its parent company, BEST Inc., to provide robots capable of successfully and safely recovering the genetically engineered bugs. Operating as BEST Inc. engineers, BEST teams have six weeks to design and build a robot capable of accomplishing the following tasks:

- Capture the genetically engineered flies, termites, and cockroaches

- Transport the captured bugs to their respective containment areas in the laboratory

- Feed the captured bugs in their containment areas

BEST

Boosting **E**ngineering, **S**cience, and **T**echnology

2010 National Championship

April 23-24, 2010
Dallas Convention Center (TX)

The top 12 teams from the fall 2009 program "High Octane"

Robotics Division National Champions

1st Place   **Conway High School** (Conway, AR – *Northark BEST*)
2nd Place   **United Engineering and Technology Magnet School** (Laredo, TX – *San Antonio BEST*)
3rd Place   **McFadden School of Excellence** (Murfreesboro, TN – *Music City BEST*)
4th Place   **Wetumpka High School** (Wetumpka, AL – *War Eagle BEST*)

BEST Award Division National Champions

1st Place   **Metro Homeschool** (Blue Springs, MO – *River Valley BEST*)
2nd Place   **United Engineering and Technology Magnet School** (Laredo, TX – *San Antonio BEST*)
3rd Place   **Wetumpka High School** (Wetumpka, AL – *War Eagle BEST*)

Founders Award for Creative Design National Champion

Given in honor of BEST's founders, Steve Marum and Ted Mahler

Wichita Homeschool (Wichita, KS – *Kansas BEST*)

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The Story Behind the 2010 Game, "Total Recall"

Educational Theme: Six Sigma Quality Control Methods in Manufacturing

The Story Line

BEST Inc. has decided to produce and market unique products – *Gadgets* and *Gizmos* – for two emerging industries. To compete in the world market, it is building four factories with the most advanced robotic control systems available. Suppliers – manufacturers of robotic control systems – must compete in trial production runs to determine which has the optimum system and strategies for implementation in the factories' production lines. In order to qualify, suppliers must have proven success in quality improvement methodologies—primarily, *Six Sigma*—with the ability to incorporate these approaches into their overall production strategy.

BEST Team Challenge

As suppliers of robotics control systems, BEST teams have six weeks to design and build a control system prototype and develop production line quality improvement strategies.

Product	Type of Production Line
Gadgets (Golf Balls)	Partially Automated
Gizmos (Easter Eggs)	Fully Automated

Team Objectives

The BEST teams with the most success in completing the following tasks will win the production trials:

- Process and package as much "good" product as possible while striving for Six Sigma3 quality levels on each production line

- Identify and remove defective products from the production lines for recall

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2011 World Championship

April 14-16, 2011
ESPN Sports Complex at Walt Disney World (Kissimmee, FL)

The top 24 teams from the fall 2010 program, "Total Recall"

Robotics Division National Champions

1st Place   **Reach Home School** (Fargo, ND – *Bison BEST*)
2nd Place   **Central Magnet School** (Murfreesboro, TN – *Music City BEST*)
3rd Place   **Metro Homeschool** (Blue Springs, MO – *River Valley BEST*)
4th Place   **Ambassadors for Christ Academy** (Bentonville, KS – *Kansas BEST*)

BEST Award Division National Champions

1st Place   **Metro Homeschool** (Blue Springs, MO – *River Valley BEST*)
2nd Place   **Decatur-Austin Robotics Alliance** (Decatur, AL – *Tennessee Valley BEST*)
3rd Place   **OKC Home School** (Oklahoma City, OK – *Oklahoma BEST*)

Founders Award for Creative Design Winner

Given in honor of BEST's founders, Steve Marum and Ted Mahler
     Decatur-Austin Robotics Alliance (Decatur, AL – *Tennessee Valley BEST*)
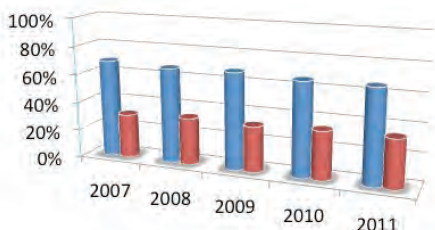

BEST **B**oosting **E**ngineering, **S**cience, and **T**echnology

Team Demographics

Gender – All Participants
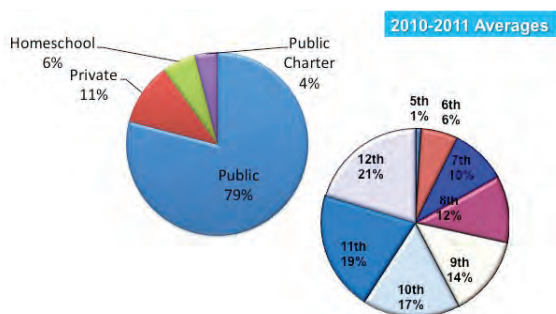**(Robotics and BEST Award Divisions)**
(5 year comparison)

	2007	2008	2009	2010	2011
■ Male	69%	67%	68%	66%	66%
■ Female	31%	33%	32%	34%	34%

■ Male ■ Female

Gender – All Participants
(3 year comparison)

2009 — Females 32% / Males 68%
2010 — Females 34% / Males 66%
2011 — Females 34% / Males 66%
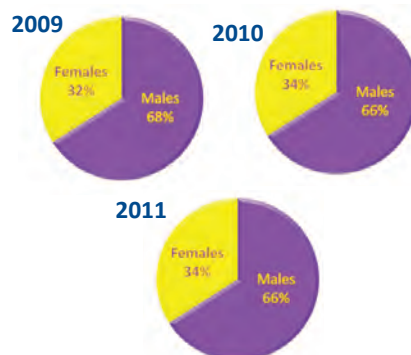
School and Grade Participation

2010-2011 Averages

Homeschool 6%, Private 11%, Public Charter 4%, Public 79%

5th 1%, 6th 6%, 7th 10%, 8th 12%, 9th 14%, 10th 17%, 11th 19%, 12th 21%

Student Participation by Race
(5 year comparison)

13%, 2%, 7%, 17%, 61%

■ African-American
■ American Indian
■ Asian
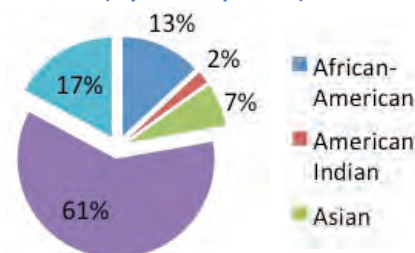
Total Student Participation by Race (%)						
	2007	2008	2009	2010	2011	Avg.
African-American	13	12	13	13	14	13
Asian	6	7	7	8	8	7
Caucasian	63	64	59	58	58	61
Hispanic	15	14	19	19	19	17
Native American	3	3	2	2	1	2

Submission of racial is optional for schools and students

Students Likely to Pursue Engineering, Science, or Technology Careers
(5 year comparison)
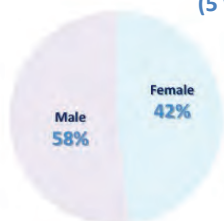
Male 58%, Female 42%

2010-2011 Averages

All, Male, and Female Students (%)					
	2007	2008	2009	2010	2011
All	56	50	52	55	58
Male	57	62	63	58	58
Female	43	38	37	42	42

School and Student Participation
(5 year comparison)

School and Student Participation					
	2007	2008	2009	2010	2011
Hubs	33	32	35	38	46
Schools	584	583	601	714	844
Students	10,038	10,727	11,558	13,347	17,977
Students per Team (Avg.)	17	18	19	19	21

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