FUTURE CITY COMPETITION

Pam Townsend, PE
Senior VP, WSP

Phyllis King, CTE NBCT
Lumberton Jr. High School, 2022 Outstanding Educator NSTEM Champion Award

Leah Townsend, Ph.D.
President, Pulvinar Neuro
Chief Science Officer, Electromedical Products International

Inspiring the next Generation of STEM Leaders

What is Future City?

The North Carolina Future City Competition is part of a national STEM program for middle school students. Nationally, 40,000 students in 6th, 7th, and 8th grade work in teams with a volunteer industry mentor, and educator to ***imagine, design, and build cities of the future that showcase their solutions to citywide issues.***

What is Future City?

Provides authentic opportunities for middle school students to answer the challenge:
"How can we make the world a better place?"

Robust Program: Teams complete four deliverables by the end of January:

- 1,500-word essay based on a yearly theme
- Project plan
- Scale model of the city built from recycled materials
- Presentation and Q&A from STEM industry judges

Previous Essay Themes

Powering Our Future

Circular Economy Principles

City on the Moon

Waste-Free City

Age-Friendly City

Power of Public Spaces

2022-2023 theme: Climate Change

Competition Timeline

Future City holds meetings and information sessions to prepare teams:

- Teacher professional development / kick-off meeting in August (CEU eligible)
  - SME theme speaker and engineering design process
- Industry Volunteer/Mentor kick-off meeting in September
  - SME theme speaker and program overview

History of the National Future City Competition

<u>DiscoverE</u> is the backbone organization behind:

- National Engineers Week™ (established 1951)
- Introduce a Girl to Engineering Day™ (2001)
- **Future City Competition™ (1993)**

***DiscoverE programs and resources have been adopted by individuals and organizations around the globe. Vision: a shared STEM experience with an industry professional, educator and student can transform the world*.**

History of the Future City Competition in North Carolina

- 2001 NC Competition formed in partnership with Professional Engineers of NC
- 2002 Held 1st NC Competition at the Museum of History, Raleigh [20 Years!]
- 2007 Moved competition to NC State University at the recommendation of NCSU Dean, College of Engineering
- 2012 NC won the National Competition (Met the President in the Oval Office!)
- 2022 38 teams/ 14 schools registered (23 teams-day of competition*), over 350 students participated (virtual due to snowstorm); Rep. Dean Arp was guest speaker

**Portions of the program can be used in the classroom as regular curriculum without team competing*

Competition Day in NC

Students arrive at N.C. State

- Over 700 attendees
  - 400+ students
  - 300+ educators, mentors, industry judges and volunteers, families, and friends
  - Organization provides lunch for everyone!

Morning Preliminary Round

- Students present and participate in a Q&A in front of a STEM industry panel
- Rotating industry judges visit each team to judge them for their specialty award category

Afternoon Final Round

- Top 5 teams present LIVE in front of all attendees (700+)
- Specialty Awards are announced, and a winner is chosen to compete in Washington DC

Industry Participation – Specialty Awards
Sponsored by engineering societies and companies

Best Use of Energy

Best Use of Multimodal Transportation

Best Physical Security

Best Land Planning

Best Teamwork

Best Use of Water Resources

Most Innovative Infrastructure

Most Resilient City

Best Waste Recovery System

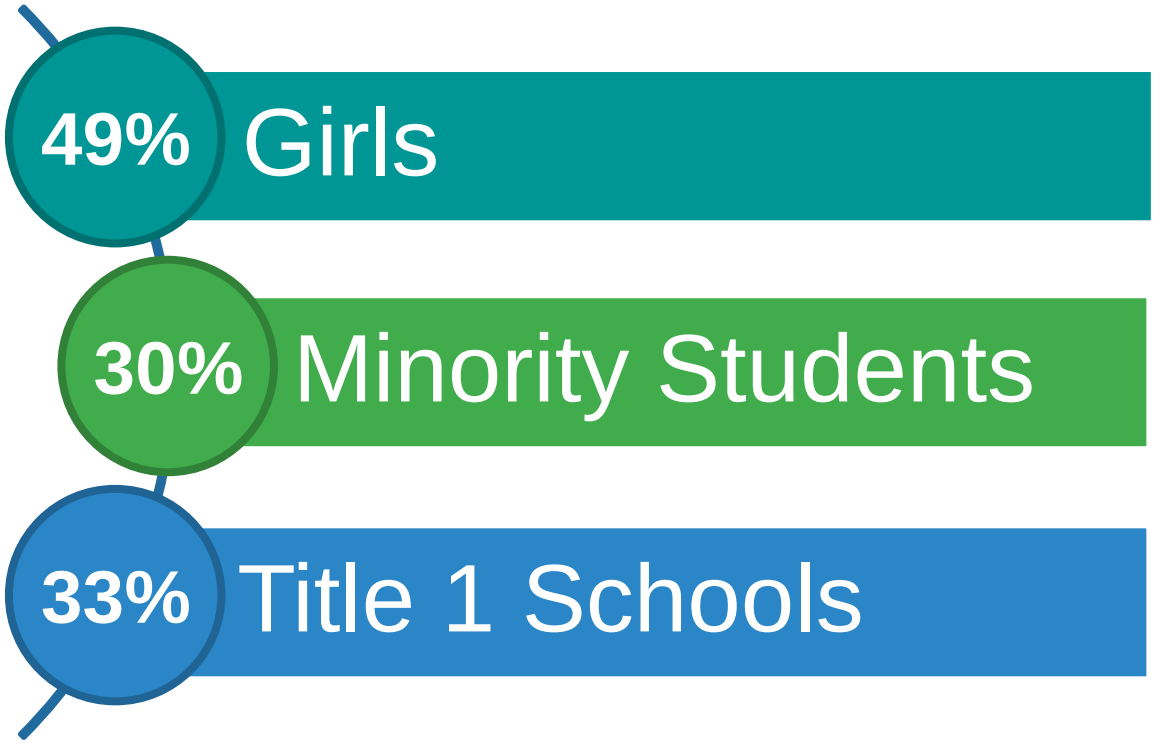
Most Creative Team City Presentation

Best Essay

…and more

$150 award to winning teams!

Impact of the Competition: Why STEM Industry has been engaged for 20+ years



High Participation of Underserved Communities

- Future City challenges students to tackle authentic, real-world problems and is accessible to every student, from the exceptional child to the gifted and talented.
- Female students, minority students, and low-income students from Title I schools all participate at record levels.

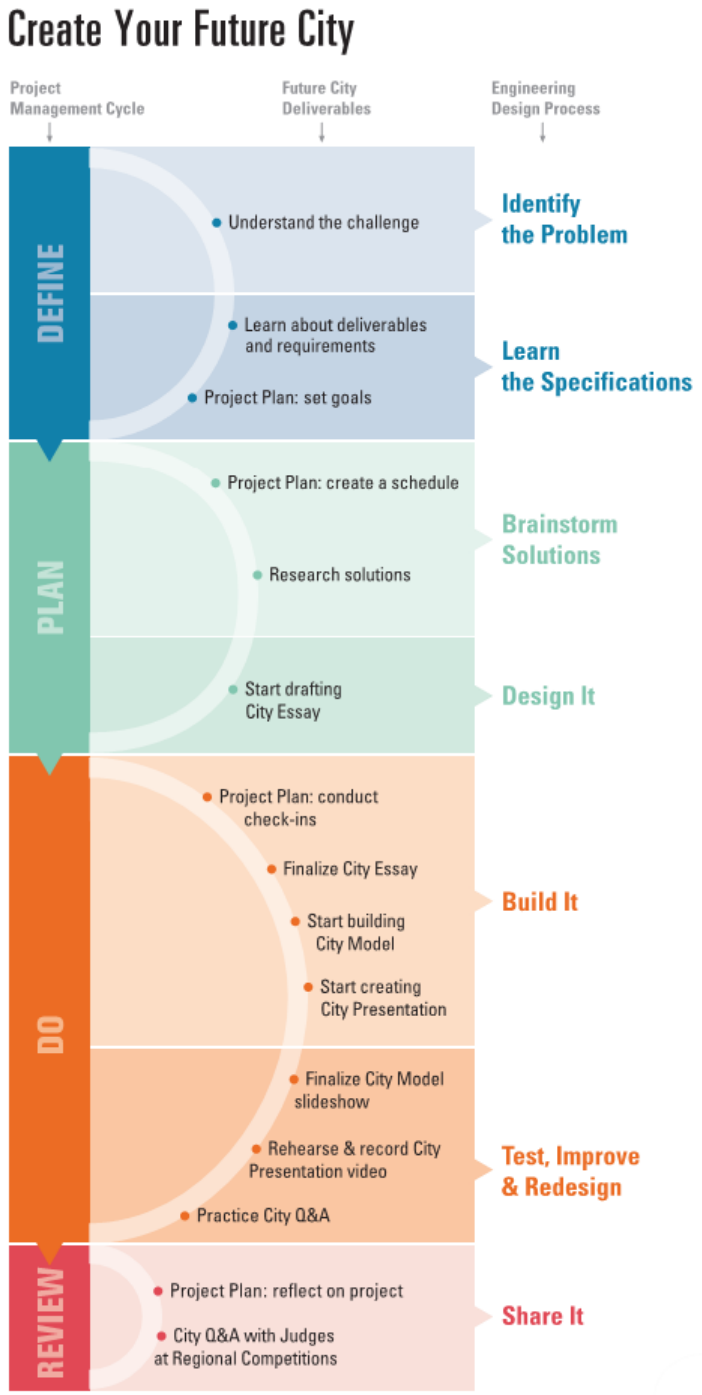
Future City Teaches the Engineering Process: Objective Problem Solving

Future City introduces students to the engineering design process.

This logical series of steps shows students how to approach a problem.

As students work through the process, they realize they can think like engineers **and see themselves as problem solvers.**

Once they understand the engineering design process by using it to build their future city, **students can apply it to all kinds of challenges and other school assignments.**



NC Standards Enhanced and Experienced Through Future City Tasks/Products

- **Science Strands:**
  - Energy Conservation and Transfer; Earth Systems, Structures, and Processes; Structures and Functions of Living Organisms
- **Social Studies Conceptual Understandings:**
  - Individuals and groups can cause change in a society through the influence of ideas, technology, and cooperative efforts; technology and innovation contribute to change in societies
- **Mathematical Practices:**
  - Make sense of problems and persevere in solving them; construct viable arguments and critique the reasoning of others; use appropriate tools strategically; attend to precision; look for and make use of structure
- **English Language Arts skills are built through authentic practice and experiences in:**
  - Researching, reading and citing evidence, speaking, writing, and listening

The Teacher's Perspective: Engaging middle school students in STEM

Engages students in STEM in a way that attracts them to consider STEM-related fields as a profession:

- Students gain confidence
- Students work with an engineer
- The program strengthens skills in math & science
- Students consider STEM career choices through exploration
- Students experience high-quality project-based learning

Recommendations from a Teacher's Perspective:

How Middle School Students can be More Effectively Engaged:

- A vision of leadership State & Local
- Access
- STEM as the Core
- High-quality professional development for teachers

Attracting Students into STEM Fields

Perspective from a former participant and team mentor-now a STEM employer

Future City provides critical enrichment opportunities that function synergistically with middle school instruction, including:

- Developing and strengthening critical thinking skills
- Supporting student-led project management
- Fostering intellectual curiosity
- Having unscripted ‘eureka’ moments

These skills and experiences are <u>essential</u> for inspiring and preparing NC’s future STEM workforce.

Future City NC received seed money in the 2021-2023 Biennium Budget - *Thank you!*

Support allowed us to:

- Provide teachers with higher stipends
- Provide teams with travel stipends
- Give out more incentive awards
- Set up operational framework
  - Finance and documentation management
  - Develop marketing materials
- Outreach to more schools (particularly Title I)

Result:

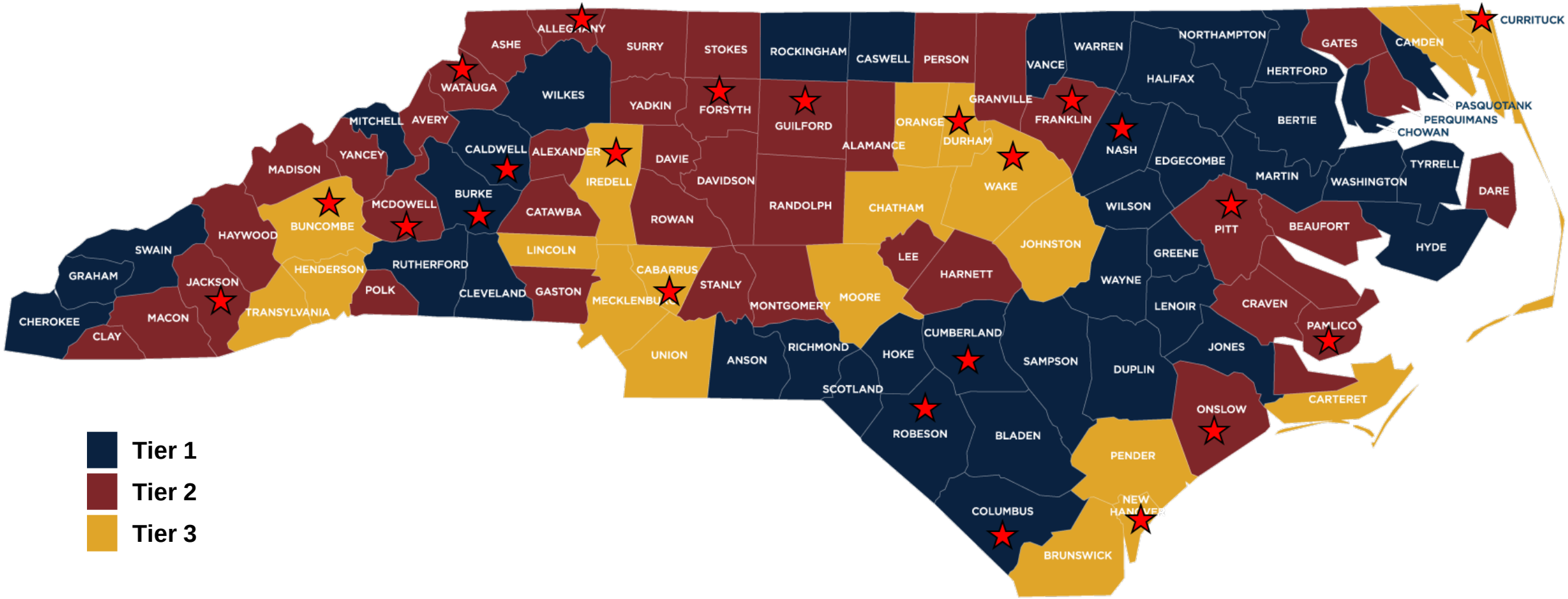
38 schools have signed up for the competition

…more than double previous two years!

Future City Competition

2022-2023 Registered Schools ★

North Carolina Department of Commerce, 2022 County Tier Designation Map



Goals

Short-Term Goals

75 schools, 150 teams signed up in 3 years

- 50 teams on competition day

Long-Term Goals

Schools participating from all 100 counties

- 100+ teams on competition day

What's Needed To Sustain and Grow Future City NC?

In order to further sustain and scale program throughout North Carolina, increased funding to:

- Incentivize and support schools
- Support multiple competitions for an expanded program
- Provide professional development for more teachers
- Outreach to more schools
- Professional support to assist volunteer committee

Funding to Support Schools

Additional Funding to support and incentivize participation

- Increase teacher stipends to compensate for effort outside of the classroom
- Provide assistance with team travel to competition as well as field research trips
- More competition prize money for schools

Expanded Competition Day Support

- Add regional competitions - Eastern, Piedmont, Western NC
  - *Day of Competition Logistics*
  - *Secure location, food, keynote speaker*
  - *Schedule of team judging – specialty awards, finalists*
  - *Orchestrate volunteers day of event*
- Winners compete in final competition for North Carolina title to compete nationally

Professional Development for More Teachers

Partnering with Higher Ed (NC State, others), offer in person and virtual teacher training on:

- Engineering Design Process
- Competition yearly theme

Eligible for Continuing Education Units (CEU's)

School Outreach

Offer program to more schools throughout North Carolina (particularly Title 1)

- Educational consultant to assist in outreach to districts and schools through NC
- Conference expenses for educators to share Future City Program

Professional Support

Professional support to volunteer steering committee to facilitate industry, corporate, educational partnerships and program logistics

- School outreach, and school/team support
- Teacher professional development logistics
- Volunteer team mentor outreach
- Volunteer judge outreach
- Marketing/media outreach
- Day-of competition logistics
- Grant writing

Keep all of the Components of the Program Moving

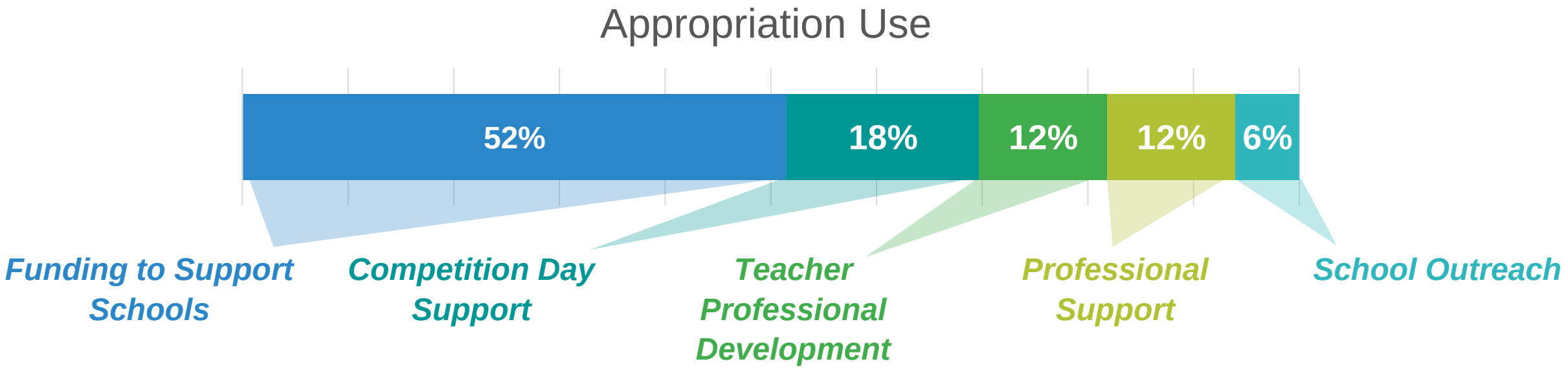
How can you help?

The NC General Assembly can directly support teachers, and schools in this high impact, STEM program which attracts an unparalleled number of girls and minority students, with a track record of going on to fill our workforce pipeline.

A recurring annual appropriation to Future City NC of $165,000 would allow us to meet and sustain our expansion goals

How can you help?

A recurring annual appropriation to Future City NC of $165,000 would allow us to meet and sustain our expansion goals



How can we make North Carolina and the world a better place?

Growing Future City Program in North Carolina will grow the “pipeline” or “garden” of North Carolina students and GIRLS!!! attracted to STEM.

Student Participant:

“I love Future City – It makes my brain sweat!”

NC State College of Engineering Dean Louis Martin-Vega:

“Middle School is where students make decisions about their interests – High School is almost too late”

Dr. Rachel Jhala

Doctor of Optometry

Former Future City Student