South Carolina Regional

Future City Competition

Teacher / Mentor Workshop

Imagine ... Research ... Design ... Create

Future City is a national, project-based learning program where students in 6th, 7th, and 8th grades imagine, research, design, and build cities of the future. Keeping the engineering design process and project management front and center, students work in teams to ask and answer an authentic, real-world question: How can we make the world a better place?

Students involved in the Future City Competition spend approximately four months creating cities that exist at least 100 years in the future. Each city must incorporate a solution to a citywide challenge that changes each year.

Goal: Introduce engineering to middle school students via authentic sustainability question and project
**Product:** Students spend 4-5 months researching and creating cities that could exist at least 100 years in the future.

**Team-based:** 6th, 7th, and 8th grade students, and an educator & volunteer mentor

Future City Overview Video
https://www.youtube.com/watch?v=reRAv9icWnU
Student Outcomes

- Apply math & science concepts
- Develop writing & public speaking skills
- Become better problem solvers
- Develop good teamwork habits
- Discover different types of engineering
- Learn how their communities work & become better citizens

Resources for Participants

- Program Handbook
- Online Videos
- Regional Trainings
- Webinars
- SimCity Software
- Assessment Rubrics
- Judge Manual

Program Cost
Normally $25 per organization - $0 in SC Region

Who Can Participate?

- Competition for 6-8 Grade Students
- Competition "OFFICIAL TEAM" Consist of 5 people:
  - 3 Students (from the same school/club)
  - 1 Teacher
  - 1 Engineer Mentor (or technical professional)
- Your school can have up to 5 TEAMS compete at the SC Regional Competition
  - Only 1 of your teams can be in the final round at the regional competition.
- See Page 11
  - Team Format Options
Program Framework

Three strands form the framework of this project, each supporting and informing the others.

- The creation of the city via five competition deliverables is the main strand.
- The other two are the engineering design process and project management.

This framework gives the project a real-world structure that both enriches the whole experience of Future City and extends the learning into the students' academic and professional futures.

Framework: Engineering Design Process (page 13)

- This cross-curricular educational program gives students the opportunity to do the things that engineers do—identify problems; learn the specs and brainstorm solutions; design solutions; build it, test and retest; and share their results.
- Introduces students to the engineering design process.
- Gives students a roadmap that cuts through confusion and helps them work through a problem sequentially.
- Students will realize that they can think like engineers and see themselves as problem solvers too.
- Once they get the hang of the engineering design process by using it to build their Future City. students can apply it to all kinds of challenges.
- With this at its center, Future City is an engaging way to build students' 21st century skills while they apply math and science concepts to real-world problems.

Video: [https://futurecity.org/leading-your-team](https://futurecity.org/leading-your-team)

Framework: Project Management (page 15)

- Project management is another organizing system that focuses on keeping the project team coordinated and moving forward.
- It dovetails well with the engineering design process, whose steps fit within the broader phases of project management.
- These two approaches to moving through a complex endeavor act as organizing bookends for students.

Video: [https://futurecity.org/leading-your-team](https://futurecity.org/leading-your-team)
How the Processes Work Together (pgs. 4 & 16)

Framework: Project Management Cycle & Engineering Design Process
https://futurecity.org/leading-your-team

Deliverables (Page 22)
Over four months, students work as a team to Imagine, Design & Build a City of the Future
1. City Essay
2. Virtual City Slideshow
3. City Model
4. City Presentation
5. Project Plan

Must address an annual citywide sustainability challenge: Clean Water: Tap Into Tomorrow (2019-2020)

DELIVERABLE: Essay
Students describe the unique attributes of their city and provide a solution to a unique challenge: Choose a threat to your city’s water supply and design a resilient system to maintain a reliable supply of clean drinking water. (1,500 words maximum).
https://www.youtube.com/watch?v=0BboNsfKLbw
Teams describe the unique attributes of their city and provide a solution to this year’s challenge.

- The essay asks students to imagine what it would be like to walk down the main street of a city 100 years in the future.
- What would someone hear, see, smell, feel? How would the people who live in this Future City describe it? How is this city futuristic and innovative?
- Maximum 1500 words
- Students must cite at least 3 sources of information used during the idea development process. MLA style preferred. Students should use a variety of info sources such as interviews, ref. books, periodicals, websites. (Wikipedia not recognized as an acceptable reference.)
- Educator or mentor must attest that the essay was written entirely by the students.
- Up to 60 points (Refer to rubric on page 68)

Clean Water: Tap Into Tomorrow Overview

We turn on the faucet and clean water flows out. Most of us don’t think about how convenient it is to be able to drink, cook, wash, shower, flush, and water our yards whenever we want. We don’t usually worry about whether water will flow from the tap, but plenty of engineers, city planners, developers, and other professionals think about it all the time. It takes expertise, planning, and constant work to keep a reliable water supply flowing. Unfortunately, people in many parts of the world cannot take clean water for granted. One in four people worldwide currently don’t have access to clean water; that’s 2 billion people. And it’s estimated that by 2025, half of the world’s population will be living in water-stressed areas— that is, areas where there is not enough water to meet everyone’s needs.

Today’s engineers, architects, and city leaders face the critical task of creating resilient cities. A resilient city withstands drought, flooding, big population changes, natural disasters, economic recessions, and other short and long-term threats. When it comes to a city’s water supply system, resilience means providing adequate clean water for both residential and commercial uses under all possible circumstances. Resilience requires preventing and fixing leaks, identifying and removing contaminants, and making sure the supply of water always meets demand in the face of disruptions and longer-term changes. As a part of a resilient city, a reliable water supply ensures that clean and safe water is provided to all its residents for their well-being, to keep their communities stable and cared for, and the city economy strong and durable.

The students’ challenge:
Choose a threat to your city’s water supply and design a resilient system to maintain a reliable supply of clean drinking water.
DELIVERABLE:  
**Project Plan**

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Program Components:  
**Project Plan - Pages 25 and 41**

Students work with their team to complete a four-part project plan that will help them stay organized, focused, and on schedule as they complete their other Future City project deliverables.

Students complete a project plan to help them plan and organize the project.
- 10 points (No rubric. Fully completed plans (with all four parts) earn the 10 points.
- Due about one week prior to Regional Competition.
- Upload as a single PDF!

*Word document containing all four parts of the Project Plan can be downloaded from futurecity.org/resources*
DELIVERABLE: Virtual City

Students design a Virtual City using SimCity software and present their city’s progress via a slide show format.

https://www.youtube.com/watch?v=L6i-waowAsU

Program Components: Virtual City - Pages 27 and 51

Students design a Virtual City using SimCity software and present their city’s progress via a slideshow.

SimCity is a great learning tool for students to understand the complexities of city design as they develop their future city. They will see how decisions (like where they place roads, power plants, or industrial zones) affect their city’s growth and development.

- For this deliverable, students choose two goals that they want to achieve in their Virtual City. (Sample Goals pg 53)
- At two points during the development of their Virtual City, students will document its development and their progress toward meeting their two goals. This emphasis closely follows the engineering design process.
- Score is largely based on the learning they demonstrate, rather than their final city.
Program Components: Virtual City

- Resources for the teams:
  - SimCity Codes – Available on Educator Page in CMS
  - Virtual City Presentation Template
  - Sample Virtual City Presentation Template
  - Benchmarks worksheet
  - Rubric
  - Related instructions (how to take a screenshot, where to find the statistics for the benchmarks, etc)

- Notes:
  - City can be designed in any region.
  - Cheat codes are discouraged but not forbidden. Must record on benchmark chart under financial aid.
  - Sandbox Mode is not allowed.
  - City Name and TEAM Name should be the same.

Program Components: Virtual City

- After you complete your Program Details Survey, codes are automatically assigned to your Teacher Center account at www.futurecity.org.

- If you’d like to request more than 3 codes, please email info@futurecity.org with # of codes requested and # of students in program. Extra codes are not guaranteed.
DELIVERABLE: **Model**

Students build a physical model of a section of their city utilizing recycled materials. In addition to highlighting their city of the future, the City Model must also show the solution to this year’s challenge and include at least one moving part and be built to scale.

https://www.youtube.com/watch?v=2R7xO13Xkw4&t=5s

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**Program Components:**
- City Model  Pages 33 and 71

Students build a physical model of a section of their city using recycled materials. In addition to showcasing their city of the future, the City Model must also show the solution to this year’s challenge. The model must have at least one moving part, be built to scale, and may not exceed the $100 expense budget.

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**Program Components:**
- City Model  Pages 33 and 71

- The model does not need to be an exact building-by-building duplication of the virtual design.
- Rather, the purpose of the model is to give a 3-dimensional, creative representation of an area that best represents the team’s vision of their future city.
- Identify and build features that best represent the city design.
- Showcase this year’s challenge.
- Model must be built to scale as determined by the team.
- Must include one moving part.
- May not exceed the $100 expense budget.
Program Components: City Model Pages 33 and 71

Model MUST include at least one moving part
No electrical cords, live animals, perishable items or hazardous materials

Model Dimensions
Must be no bigger than 20" high, 50" long, and 25" wide. During the presentation, it is permissible to have extended parts, such as access doors, compartments, and hinged pullouts, as long as they are fully self-supported by the model, or – if removable – held by a presenter.

Program Components: City Model Pages 33 and 71

The total value of the materials used in the model, as well as those used in support of the presentation and special awards, (including color copying/printing, visual aids, costumes, and other demonstration aids) may not exceed $100 and must be reported on the Competition Expense Form found on page 94.

- Monitor your budget
- All materials except “recyclables” need to have a value
- $100 limit will be strictly enforced
- Use Recycled Materials – start collecting now
- Consider weight and mobility
- During judging the models will have to be moved from room to room
- Winning team is also responsible for designing the shipping box to Nationals

Up to 70 Points (see scoring rubric on page 75)

DELIVERABLE: Presentation

Students give a 7-minute presentation discussing features of their Future City and their solution to the challenge, followed by a question and answer period of 5–8 minutes from the judges.

https://www.youtube.com/watch?v=JaGnclbexQ&t=3s
Program Components:
City Presentation Pages 34 and 78

Students give a 7 minute presentation discussing features of their future city and their solution to the annual challenge followed by a 5 - 8 minute question and answer period from the judges.

Students will be able to:
- Identify and explain features that best describe their city design.
- Students will concisely describe specific design issues, innovations, features, and key aspects of their future city.
- This is the time to "SELL" your project.
- Illustrate city design features using the physical model, props, and visual aids.
- Demonstrate teamwork (such as sharing presentation tasks, supporting each other during the presentation, displaying equal amount of knowledge).
- Explain the role of engineering in their city design.

Program Components:
City Presentation Pages 34 and 78

- Answer questions about their city, the process they went through to create their city, their solution for this year's topic, and knowledge they gained.
- Presentation is made in front of a panel of judges.
- Practice your presentation for an audience: parents, your administration, your mentor's office, etc.
- Practice, Practice, Practice.
- Following the presentation the judges will ask questions of the students about their experiences and their future city.
- Be ready for anything!
- Guidelines on Visual Aids and Props (pg 78)
- Up to 70 Points (see scoring rubric on page 80)

Scoring Rubrics

- Available in Handbook and Online
- WWW.FUTURECITY.ORG/FORMS
- Rubrics designed to help your teams do better
- Helps judges to judge fairly
- Before you submit - judge yourself
- Based on the rubrics you should be bale to have a good idea of how your team will do on any competition component based on the rubric.
- Virtual City Design — pg. 54
- City Essay — pg. 68
- City Model — pg. 75
- City Presentation — pg. 80
Anatomy of an AWESOME Team

- **READ the Handbook – TO-DO LIST PAGE 9 (Great starting point)**
- **Have a project plan – plan of attack for the upcoming school year**
- **Build relationship with mentor**
  - Discuss what roles each will play on the team
  - Have reasonable expectations (volunteers – work commitments/deadlines)
- **Get parents involved**
  - Letter to the Parents
  - Forward information, emails and important dates to parents
  - Some work/research can be done at home
- **Know what the deadlines are and meet them EARLY**
- **Revise your submits against the rubrics before they are turned in**
- **Contact Coordinators for support when needed**
SPECIAL AWARDS
Taylor Rice

SIMCITY OVERVIEW
Puneeth Kumar

Contact Information