Introduction to Future City Program Basics

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www.dfwfuturecity.org
4 Orientation Webinars

- This presentation covers
  - Basic information about FCC
  - Rules, procedures
  - Deliverables

- Orientation – Annual Introduction
  - Information specific to this year’s program
  - Information specific to the North Texas region

- Orientation – Regional Competition Event
  - Process and procedures for competition day

- Orientation – Model slideshow
  - Pictures of models from regional and national competitions
Agenda

- Overview of program
- Understanding project phases
  - Specific rules and guidelines
  - Resources
  - Deliverables
  - Timeline
- Lessons learned
A Brief History

- Nationally
  - Sponsored by DiscoverE (formerly National Engineers Week) Foundation
  - Began in 1992
  - About 40 regions, 30,000 students involved annually

- North Texas
  - 17th year
  - More than 700 students involved annually
  - From ~50 schools and youth organizations across N TX
  - With support of > 100 volunteers from engineering organizations, companies
What is Future City?

- Project-based educational program
- Skills learned:
  - Problem solving
  - Teamwork
  - Public speaking
  - Research, writing
  - Math, science, engineering
  - Project and time management
What is Future City?

- **The Challenge:**
  - Design and Build a Livable City of the Future

- **Project phases, goals**
  - Form the team
  - Conceive an initial city plan, design
  - Simulate, refine solution
  - Research, write paper
  - Build physical scale model
  - Stay within budget
  - Present final solution to judges
FC & The Engineering Design Process

Future City Stages
- Form the team
- Conceive an initial city plan, design
- Simulate, refine solution
- Research, write paper
- Build physical scale model
- Stay within budget
- Present final solution to judges

Engineering Design Process
- Identify the problem
- Learn the specifications
- Brainstorm solutions
- Design
- Test, improve, redesign
- Share
Before You Start
Where to look for answers
Program Handbook

- Rules
- Teaching points
- Background information
- Rubrics
- Forms
Two Websites: NTX Region, National

- NTX Regional
  - www.dfwfuturecity.org
    - Region-specific info
    - Schedule, due dates
    - Local resources
    - Program updates
Team Center – *Bookmark it!*  
First stop for all local information  
- Schedule, rules  
- Program updates  
- Resources
Team Center – *Bookmark it!*

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  - Resources
Enrolling Teams in the Team Center
www.dfwfuturecity.org/teamcenter.html

- Team Center – *Bookmark it!*
  - First stop for all local information
    - Schedule, rules
    - Program updates
    - Resources

- Create and manage teams
  - Assign team members
  - Submit deliverables
    - Automatic confirmation of submission
  - Download team scores
    - Available after the competition
National Website

- National futurecity.org
  - Overall program info
    - General resources
    - Program description
National Website

- [National futurecity.org](http://futurecity.org)
  - Overall program info
    - General resources
    - Program description
If you still can’t find the answer ...

- Ask
  1. Region coordinator
     regional@dfwfuturecity.org
  2. Region school coordinator
     jfreer@gmail.com
  3. National program manager
     info@futurecity.org
Program Details
Step 1: Build the Team
Teams

- Schools/organizations are represented by teams
  - 3 students, 1 educator/sponsor, 1 engineer-mentor
  - At the regional event (model-presentation judging) you need to have a team
- Student team members – must be from the same organization
  - Don’t have to be from the same class or same grade
  - 6th, 7th, and 8th grades eligible
Prior to the presentation, educators and students may:

1. Work in large groups (classes, clubs, etc.)
   - Assign work equitably
   - Down-select to 3 students – “the Team” – to represent all

2. Work with multiple teams (groups of 3-4 students)
   - All teams complete all phases
   - Select some (or all) teams to send to regional
     - Max 8 teams from one school/organization
     - Select teams by: Intramural run-off competition, Grades, Lottery
     - Teams compete (present) in the preliminary round
     - Only one team per school/organization may advance to the final round
Teamwork

- Teamwork is an important part of the program
- Decisions are reached by consensus
- Everyone contributes
  - Agree on assignments
  - Agree on responsibilities
- Resources:
  - Team building activities on National FC website
    - Teambuilding, brainstorming, conflict resolution
Finding an Engineer-Mentor

- Parents of students, PTA newsletter
- Spouse or friend of educators
- School/organization business partner
- City bureau of engineers
- TX DoT
- US Army Corp of Engineers
- Local engineering firms
- National Engineers Week sponsors (www.discovere.org)
- Local Chapters of Engineering societies
- Regional Mentor Coordinator – Tom Hunt
Engineer-Mentor

- Involved in all phases of the competition
- Advisor, coach
  - Students do all the work, make all the decisions
- Provides real-life engineering experience
  - Project planning
    - Scheduling
    - Setting realistic goals
    - Helping to assign tasks
  - Understanding roles of engineers, engineering disciplines
- Resources:
  - Mentor coordinator
  - Online tips, advice, webinars
Ethics, Roles and the Honor Statement

- Future City is an educational program
- Rules are designed to ensure a fair competition
- **Students** envision the city and do all the work
  - Design, simulation, research, writing, model building, presentation
- **Adults** provide guidance and advice
  - Should be present when teams work with tools, build models
- Everyone adheres to the rules
- Team members sign and submit an Honor Statement
Step 2: Make a Plan
Project Planning

- Plan it before you build it…to help you
  - Establish goals
  - Stay organized
  - Focus on goals and results
  - Moving forward on schedule
Project Plan Deliverable

- Project Plan – 4 parts
  1. Set goals for the entire project
  2. Create a schedule
  3. Monitor progress periodically throughout project
  4. Reflect on team performance at end of project

- Project Plan (4 parts)
  - Single Word document file
  - Submit through Team Center
  - 10 points (not judged)
  - Due January

- Resources
  - Project Management tutorial – recorded 2017
  - Team Center resources “Where to learn more”
Step 3: Virtual City – Planning, Simulation
Goal of the Virtual City Exercise

- You should learn ... how to
  - Establish meaningful long-term goals for your future city
  - Develop a city design for achieving those goals
  - Use the simulation tool to test the design
  - Accurately assess progress based on simulation results
  - Refine the design as necessary to improve progress

- **Goal of exercise is NOT to**
  - Create the perfect city
  - Win the SimCity game
You decide – What will the future be like?

- **Your city goals**
  - Cheap, renewable, sustainable energy sources
  - Efficient, effective public transportation
  - Green technologies, industries and utilities
  - Healthy and clean: no pollution, recycle/reuse garbage
  - Safe: low crime, immediate emergency response
  - Instant global communication
  - Recreation: Parks, amusements
City Planning & Design

- **Plan before you play**
  - Decide on where your city will be located (geography, climate, environment)
  - Develop goals for your city (keep in mind the yearly theme)
    - Green utilities, no pollution
    - Public transit, no cars
    - Healthy city, parks, recreation, walkable
  - Develop a basic city plan or layout
    - Zones, neighborhoods, downtown, commercial areas, suburbs
    - Traffic patterns
    - Industry, special services
  - Pick an imaginative, meaningful name
Simulation – testing the design

- Simulator = SimCity
- Testing your city plan/design
  - You are the mayor, you control the budget
  - Input your design, add the infrastructure
    - Test different options, choose the best
  - Program supplies the Sim citizens
  - The better you design it, the more citizens will move in
Virtual City Rules

- **SimCity rules**
  - Offline mode
  - Choose any SC region, any city site
  - Do NOT use sandbox mode
  - Turn off random disasters

- **Develop a realistic, functional city**
  - No pasting in (or otherwise adding) features not earned
  - Don’t outsource expensive services like utilities or major polluters
  - Cheat codes & gifts discouraged, but allowed w/ appropriate documentation
Virtual City Materials

- Download codes for SimCity software
  - Request codes: Team Center, teacher menu
  - Additional codes may be available (limited number)

- Virtual City Slideshow materials
  - Slideshow template – fill in with data and screenshots
  - Sample slideshow
  - Benchmark chart for monitoring your progress
  - Sample goals (handbook)
Virtual City Slideshow

- Choose two goals for virtual city design and work toward those goals
- Document your city development at two points in time
  - Assess progress
  - Take screenshots to document development
  - Refine design to correct problems
- Rubric
  - Understanding and following the template
  - Testing and refining the design
  - Lessons learned
  - Judge’s assessment of design and process
City Planning and SimCity Resources

- NTX Webinars
  - City Planning – recorded in 2014
  - SimCity Tips for Success – recorded in 2014
  - The Virtual City Deliverable – recorded Oct 2016

- NTX Team Center – “Resources” page
  - City Planning resources
    - “Where to learn more”
    - City Planning Exercises (National website)
  - SimCity resources
    - Download instructions for Origin and SimCity
    - NTX SimCity Tips
  - Virtual City deliverable resources
    - Links to templates and forms
Virtual City Design Deliverable

- Virtual City slide show
  - created per template with PowerPoint, Google Docs, Word, etc.
- Submit through Team Center
- Scored on: testing and refining design, learning outcomes
- 48 points
- Due early December
Step 4: Research Essay
Research Essay

- **Goal of the writing exercise**
  - Verbally describe the city of the future
  - Develop effective research skills
  - Investigate solutions to the assigned topic
    - Analyze tradeoffs of possible solutions
    - Select the best solution
  - Understand technology required
  - Become familiar with engineering roles in city design and operation
Research Essay

- Topic – changes yearly
  - Describe the problem in your future city
  - Use futuristic technology to solve the problem

- Rules
  - Word limit: 1500 max; Graphics: 4 max
  - Include bibliography with min of 3 sources
  - Plagiarism not allowed

- Resources
  - List of topic resources online and in handbook
  - Examples of past best essays online
  - Tutorial webinar recording
Essay Outline

- Introduction and overview
- City basics – description of the city
- Describe the problem (yearly theme)
- Describe the solution
  - Futuristic technology
  - Engineering involved
  - Benefits, tradeoffs
- Conclusion
Research Essay Deliverable

- Document (doc format)
- Upload through Team Center
- 60 points
  - Scored on creativity, how well you explore/explain the issues, use of new technologies, role of engineers, writing skills
- Due December (before holidays)
Step 5: Physical Model
Goal of the Physical Model

- Final opportunity to Design → Build → Refine the city
- Learn about scale and how to apply it
- Implement a moving part
- Study power sources to drive the movement
- Work within constraints of a budget

Engineering Design Process
Design → Test → Refine/Redesign → Build → Test → Refine/Redesign
Physical Model Rules

- A creative representation of a section of your city
  - Does not have to be an exact duplication of the SimCity

- Built to scale
  - You select the scale
    - No more than two different scales
    - Depends on the city section you are modeling and amount of detail
  - Apply scale consistently in all three dimensions

- Model size: 25” (w) x 50” (l) x 20” (h)
  - Not to exceed
  - Includes all supporting structures, all moving parts, all extension parts (hinged doors, drawers, access panels, etc.)
Physical Model Rules

- **Model Weight** – no specific limit
  - Kids have to be able to move it
  - Going to National Competition: Models > 75 lbs (including shipping container) will incur additional charges

- **Building Materials**
  - Recycled materials encouraged
  - No live animals, no perishable items (e.g., no Jello)

- **Moving part**
  - Manually moved, blown on, spring driven
  - Electric – self-generated, battery powered, NO plugs
Model Budgeting

- Cost of materials for model *plus* presentation cannot exceed $100
  - Recycled materials (plastic bottles, cans, boxes, etc.) $0
  - Used items (toys, building materials, etc.) Fair market value *
  - Donated items, Borrowed items Fair market value *
  - Purchased items Receipts
  - 3D printed items Valued per handbook

- Document expenses on Expense Form
  - Bring to competition with model

* Fair market value = garage sale or E-bay price
Physical Model Resources

- NTX Team Center Resources
  - Where to learn more – pictures and material lists of top models
  - Pictures of past models

- FC activities
  - Understanding scale
  - Model construction
Physical Model Deliverable

- 3-D scale model of a section of your city
  - Must have a moving part and be self-powered
  - Cannot spend more than $100 on materials

- Expense Form

- Model ID card
  - City name, team member names, school/org name
  - Scale

- 70 points
  - Scored on creativity, realism, accuracy and scale, quality of workmanship

- Due late January
Step 6: Presentation
Team Presentation

- Goal of the Oral Presentation:
  - Speak confidently in front of audience
  - Organize and express ideas clearly
  - Think on your feet responding to Q&A
  - Demonstrate teamwork
  - Manage time during presentation
  - Create and effectively use visual aids
Presentation Rules

- **Team presentation**
  - Max 7 minute oral presentation
    - There will be timers in the rooms
    - Explain the design and function of the city
    - 5-8 minutes of Q&A follow formal presentation

- **Visual aids: model, posters, flipcharts, display board**
  - No laptops, overhead projectors, videos, tablet computers, cell phones
  - No audio equipment

- **Resources**
  - Team Center Resources page – “Where to learn more”
  - Presentation Skills webinar (2013) – recorded session
  - NTX team presentation at national finals
Presentation Rules

- **Visual aids**
  - Size limit, quantity limit
    - No more than 2 displays of poster board (24”x36”) or flip chart (25”x30”)
    - Multiple display boards can be stacked on the easel
  - We supply one easel

- **Additional demonstration aids**
  - Must collectively fit within a 6” x 6” x 12” volume (e.g., a shoe box)
    - Includes pointers, brochures, handouts, small mockups, etc.
    - Handouts are limited to one page

- **Cost of presentation materials plus cost of model materials cannot exceed $100**
  - Presentation costs include all materials: display boards, flip charts, costumes, uniforms, props, pointers, handouts, etc.
Presentation Deliverable

- 5-7 minutes of presentation
  - 7 minutes maximum
  - Followed by 5-8 minutes of Q & A (total max time = 15 minutes)

- Expense Form
  - Shared with Model

- 70 points
  - Scored on technical knowledge, city design/features, innovation, teamwork

- Due late January
To Sum Up
To Review – Deliverables and Forms

- Home school affidavit (homeschools only) Mail to Regional Coord.
- Virtual City Slideshow Upload to Teamcenter
- City Essay Upload to Teamcenter
- Project Plan Upload to Teamcenter
- Honor Statement Upload to Teamcenter
- Physical Scale Model Bring to Regional Event
- Expense Form Bring to Regional w/ model
- Model ID card Attach to model
- City Presentation At Regional Event
- Media Waiver Form Upload or Bring to Regional

All forms available on Team Center Resources page
<table>
<thead>
<tr>
<th>Date Range</th>
<th>Event Description</th>
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<tbody>
<tr>
<td>Oct 31</td>
<td>Registration deadline</td>
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<tr>
<td>Sep-Nov</td>
<td>Students work on City Plan/Design and SimCity</td>
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<tr>
<td>Early Dec</td>
<td>Virtual City slide show due</td>
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<tr>
<td>Oct-Dec</td>
<td>Students begin essay research and writing</td>
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<tr>
<td>Mid Dec</td>
<td>City Description due</td>
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<tr>
<td>Dec-Jan</td>
<td>Students work on model and presentation</td>
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<tr>
<td>Mid Jan</td>
<td>Project Plan due, Honor Statement due</td>
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<tr>
<td>Late Jan</td>
<td>Competition at UT Arlington, Award ceremony</td>
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<td>Feb</td>
<td>National Finals in Washington, DC</td>
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Special Note – Potential Conflicts

- Duke Talent Search SAT (7th grade)
  - Don’t select the January test date!
    - Option: UTA is a test site (reduce travel time)

- UIL competitions

- Options for those with conflicts
  - Notify Regional Coordinator by 20 December
    - Limited number of late Prelim Round presentation times allocated on first-come, first-served basis
  - Arrange for other team members to handle Special Awards judging Q&A

- Note: there is a letter to parents on website (Team Center Resources)
  - Outlines FC program and dates
Lessons Learned

- Engineer-Mentor is necessary
- This project takes time
  - Educators – 30-40 hours
  - Mentors – 20-40 hours
  - Students
    - Design city – 18-20 hours
    - Build model – 40-60 hours
    - Essay, Narrative – 8 hours
    - Presentation – 7 hours
- Don’t wait until January to start model and presentation pieces
  - Start collecting recyclable “building” materials now
Lessons Learned (cont’d)

- Keep parents informed
  - Letter to parents (sample on website)
- Winning teams are successful on all phases
- But, Penalties for late work won’t kill your chances
  - All late penalties combined are less than 7% of total score
- Read the handbook and rules for N TX competition
- Educator and mentor act as advisors, not designers
- Consider bringing in topic-area experts
Regional Committee

Regional Coordinator: Jean Eason
Judging Coordinator: Richard Reppert
Mentor Coordinator: Tom Hunt
Event Coordinator: Jacquie White
Photos, Prizes: Diane Collier
Special Awards: John Colotta, Tamara Cook
Public Relations: Katia Gomez
Facilities: Dave Davis