Introduction to Future City

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www.dfwfuturecity.org
Agenda

- Overview of program
- Online Team Center
- 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
  - 16th 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
You decide – What will the future be like?

- Solving real-world problems
  - Cheap, renewable, sustainable energy sources
  - Efficient, effective public transportation
  - Green cities: technologies, industries and utilities
  - Healthy, clean cities: no pollution, recycle/reuse garbage
  - Safe cities: low crime, immediate emergency response
  - Instant global communication
  - Parks, recreation, amusements
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
Where to Find Answers

1. Program Handbook
   - Rules
   - Teaching points
   - Background information

2. Websites
   - Regional
     www.dfwfuturecity.org
     • Region-specific info
     • Schedule, due dates
     • Local resources
     • Program updates
Where to Find Answers

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     - www.dfwfuturecity.org
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       - Local resources
       - Program updates
   - National
     - futurecity.org
       - Overall program info
       - General resources
       - Program description

3. Ask
   - Region coordinator
   - Region school coordinator
   - National program manager
Team Center – *Bookmark it!*

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

- **First stop for all local information**
  - **Schedule**, rules
  - Program updates
  - Resources
FC NTX Team Center
www.dfwfuturecity.org/teamcenter.html

- Team Center – *Bookmark it!*
- First stop for all local information
  - Schedule, rules
  - Program updates
  - 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
What’s Different This Year

- Very few changes this year
  - Simplified Virtual City slide show

- Point allocations for some components
  - Total points down from 264 → 258
  - **Virtual City:** 48 (19% of total)
  - **Essay/City Description:** 60 (23% of total)
  - **Project Plan:** 10 (4% of total)
  - **Model:** 70 (27% of total)
  - **Presentation:** 70 (27% of total)
2016-17 Registered Groups

- Ann Richards MS, Dallas
- Applied Learning Academy, Fort Worth
- Austin Achieve Public School, Austin
- Bessie Coleman MS, Cedar Hill
- Boulter MS, Tyler
- Carter JH, Arlington
- Cooper JH, Wylie
- Coppell MS North, Coppell
- Dallas Academy, Dallas
- David Walker IS, Fort Worth
- Donna Park Elementary, Hurst
- Dowell MS, McKinney
- Fort Worth Academy, Fort Worth
- Girl Scouts-Forney, Forney
- Harbor View Academy, Rockwall
- Harmony Sch of Business, Dallas
- Harmony Sch of Innovtn, Fort Worth
- Harmony Sch of Innovtn, Garland
- Harts Bluff Elementary, Mt. Pleasant
- Hill Country MS, Austin
- Homeschoolers Excel, Grapevine
- Hunt MS, Frisco
- Intl Leadership TX Garland, Garland
- Irma Rangel Young Women’s Leadership, Dallas
- Kennedale JH, Kennedale
- McLean MS, Fort Worth
- Pearson MS, Frisco
- PE Wallace MS, Mt Pleasant
- Pioneer Heritage MS, Frisco
- Richardson West JH, Richardson
- Sam Houston MS, Irving
- Scoggins MS, McKinney
- Staley MS, Frisco
- Summer Creek MS, Crowley
- TCC Generation Hope, Fort Worth
- Thrall MS, Thrall
- Uplift Luna Preparatory, Dallas
- Village Tech Schools, Cedar Hill
- Washington MS, El Dorado, AR
- West Ridge MS, Austin
- Westwood School, Dallas
- Wheat MS, Cleburne
- Young Women’s Leadership Academy, Fort Worth
2016 North Texas Sponsors
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
- **Due January 16**
  - Upload through the Team Center
  - Submissions from Jan 17-20, -1 point
  - Submissions after Jan 20, not accepted
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

- Resources
  - Team Center resources “Where to learn more”

- Project Plan (4 parts)
  - Single Word document file

- Submit through Team Center

- 10 points (not judged)

- Due January 16
  - Submissions from Jan 17-20, -5 points
  - Submissions after Jan 20, not accepted
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

**Engineering Design Process**

Design → Test → Refine/Redesign → Build → Test → Refine/Redesign → Design
Plan before you play
- Decide on where your city will be located (geography, climate, environment)
- Develop goals for your city
  - 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 – revised 2017
  - 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
  - pdf created with PowerPoint, Google Docs, Word, etc.
- Submit through Team Center
- Scored on: testing and refining design, learning outcomes
- 48 points
- **Due December 2**
  - Submissions from Dec 3-Dec 19, -5 points
  - Submissions after Dec 19, not accepted
Step 4: City Description (essay)
City Description/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
2017 Topic: “The Power of Public Spaces”
- Design a distributed network of multiuse public spaces to serve the diverse population
- Rehab two areas into public spaces:
  1. Roadway
  2. Greyfield or brownfield

Rules
- Word limit: 1500 max; Graphics: 4 max
- Include bibliography with min of 3 sources

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

- Introduction and overview
- City basics – description of the city
- Describe the public spaces problem
- Describe the solution
  - Conversion of two spaces
  - Engineering involved
  - Benefits, tradeoffs
- Conclusion
City Description 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 18**
  - Submissions from Dec 19-Jan 8, -5 points
  - Submissions after Jan 9, not accepted
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

- Design
- 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
  - Dependent on the section you are modeling, 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

- Document expenses on Expense Form
  - Bring to UT Arlington 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 January 27-28**
  - Deliver to UT Arlington
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 (2016)
Presentation Rules

- Visual aids
  - Size limit, quantity limit
    - One display: 60” x 36” -OR- Two displays: 30” x 36” each
    - 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 January 28**
  - At UT Arlington
To Sum Up
To Review – Required Forms

All forms available on Team Center Resources page

- Home school affidavit
  - Home schools only
- Expense Form
- Model ID card
- Honor Statement
- Media Waiver Form

Mail to Regional Coord.
Bring to UTA w/ model
Attach to model
Team Center upload
Upload or
Bring to UTA at check-in
<table>
<thead>
<tr>
<th>Date</th>
<th>Event</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>Dec 2</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>Dec 19</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>Jan 16</td>
<td>Project Plan due, Honor Statement due</td>
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<tr>
<td>Jan 27</td>
<td>Team check-in, deliver model to UTA</td>
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<tr>
<td>Jan 28</td>
<td>Competition at UT Arlington, Award ceremony</td>
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<tr>
<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
- Photos, Prizes: Diane Collier
- Special Awards: John Colotta, Victoria White
- Public Relations: Katia Gomez
- Facilities: Carter Tiernan, Dave Davis