

Welcome

Thank you so much for volunteering to judge the 2010 National Engineers Week Future City® Competition. You, along with thousands of other volunteers, make this program a reality. With your support we are able to expose over 30,000, seventh and eighth grade students to engineering in a real world, hands-on, setting. With all their hard work and dedication the entire program would be for naught without people like you who are willing to give their time to assess the work of the students. Again, thank you and welcome to the future.

Your Role as a Competition Judge

Your role as a judge is to draw on your expertise and resources to fairly assess the team's efforts. Your scores for the component that you judge will be tallied with the other judges' scores to select the overall Regional winner. Please remember that these students are in the seventh and eighth grades and all questions should be directed to them at their level of comprehension.

Competition Structure

Mission Statement:

The mission of the National Engineers Week Future City Competition is to provide a fun and exciting educational engineering program for seventh- and eighth-grade students that combines a stimulating engineering challenge with an inquiry-based application to present their vision of a city of the future.

BENEFITS OF THE NATIONAL ENGINEERS WEEK FUTURE CITY® COMPETITION:

The program offers students a fun way to learn about engineering and cities of the future while at the same time developing academic skills.

The National Engineers Week Future City® Competition provides a platform for students to increase their:

- Logical thinking skills,
- Problem-solving skills,
- Ability to work in teams,
- Research and technical writing skills
- Oral presentation skills,
- Application of coursework to practical problems,
- Technological skills, and
- An Awareness of community and business issues on the local and global levels.

Program Components Overview

1. **Computer Design of a Future City.** Students use *SimCity 4 Deluxe™* software to design a city that has progressed at least 150 years in the future and has a population of at least 50,000. Students self-score their Future City computer design to ensure they have met all the required design elements. The teacher or mentor must attest to the accuracy of this score sheet.
2. **Model of Future City.** Students select an area of their Future City to be represented in the model they build following specific guidelines found in the Future City model rubric on page 18.
3. **Research Essay.** Students write a 700–1000 word essay citing at least 3 sources of information. This year’s essay topic is; “Providing an affordable green living space for people who have lost their home due to a disaster or financial emergency.”
4. **Future City Narrative.** Students write a 300–500 word City Narrative describing their Future City’s key features. The engineer mentor or teacher must attest that the narrative was written by the students.
5. **Oral Presentation.** Students give a presentation describing key elements of their Future City.

Completing the Score Sheets

The National Engineers Week Future City® Competition Score Sheets are divided into four areas for the judges and one for student self-evaluation. You have volunteered to judge one or more of these areas listed below. Please carefully read over the areas that you have been asked to assess, including the area's rubric and score sheet. If you have any questions don't hesitate to contact your Regional Coordinator or the National Program Manager

1. Computer City Design Self-Evaluation (0–16 points)

This is the area in which the students assess their city's development by answering a series of questions. No further action is needed by the judges.

2. Computer City Design (0–84 points)

The computer design illustrates the different zoning sections, residential, manufacturing, and industrial; as well as infrastructure such as utilities and roads. You are asked to assess the city utilizing the Computer City Design Rubric on the following criteria: Social Service, Energy and Pollution, Transportation, and Recreation.

3. City Model (0–120 points)

Utilizing mostly recycled materials the team has built a scale model of a portion of their city. You are asked to assess the model using the Future City Model Rubric based on the following criteria: Creativity, Quality, Accuracy and Scale, Moving Component, and Use of Recycled Materials.

4. Oral Presentation (0–90)

The team will prepare a 5–7 minute presentation discussing the city and its amenities. The team will be assessed utilizing the Oral Presentation Rubric on the following criteria: Knowledge of the city and the essay question, Teamwork, and Presentation Skills.

5. Research Essay/City Narrative (Research Essay 0–70 points; City Narrative 0–20 points)

The team will write a 700-1000 word essay based on this year's engineering challenge question. The essay is assessed utilizing the Research Essay Rubric based on the following criteria: Selection of Living Space, Research, Use of Green Materials and Value, and Writing Skills. The City Narrative is assessed utilizing the City Narrative rubric based on the following criteria: Physical Description, Description of City Services, Description of Population, and Writing Skills.

Scoring Deductions

Penalty	Item	Description
5–10 pts.	Missing deadline for submission of the Computer City Design (Disk) and Computer Score Sheet. Deadline will be set by the regional coordinator.	The Computer City Design (CD_ROM) and Computer Score Sheet must be received in accordance with the deadline set by the regional coordinator.
5 pts.	Missing deadline for submission of the Essay and Abstract. Deadline will be set by the regional coordinator.	The Essay and Abstract must be received in accordance with the deadline set by the regional coordinator.
2 pts.	Computer Score Sheet incomplete.	A properly filled out Computer Score Sheet must be submitted with the Computer City Design (CD-ROM).
2 pts.	Essay Form incomplete or missing	A properly filled out Essay Form must be attached to the Essay and Abstract. Follow instructions on the form.
15 pts.	Competition Expense Form missing.	The Competition Expense Form with receipts attached to the back, must be brought to the competition.
5 pts.	Receipts missing from back of Competition Expense Form.	Receipts must be attached to the back of the Competition Expense Form. Follow instructions on the form.
1–5pts.	Missing all or part of the Model ID.	The Model ID should be identified by a 4" x 6" index card with: Future City name, school name, team members names (3 students, teacher, engineer-mentor), and scale used.
5 pts.	Exceeding presentation time.	Verbal presentation by team is 5–7 minutes. Presentation cannot exceed 7 minutes.
15 pts.	Exceeding model dimensions and weight	The maximum dimensions of the model are 20" (H) x 50" (L) x 25" (W). Height and width dimensions include all supporting structures, such as braces, and any model materials hanging below the tabletop. Weigh no more than 75 lbs.

Penalty	Item	Description
15 pts.	Exceeding Presentation dimensions.	Support materials may consist of either: 1. A single display not exceeding 60" (W) x 36" (H) OR; 2. Two displays not exceeding 30" (W) x 36" (H) each. 3. The size does not include the easel stand, if one is used.
15 pts.	Expenses exceeding \$100.	The Competition Expense Form with receipts attached to the back, must be available the day of the competition.
20 pts.	Unsportsmanlike conduct by team members or guests.	This includes, but is not limited to: rude behavior to judges, competitors, or teammates; disruption of another team's judging session.
Disqualified	Destruction of another team's project.	

Essay Assignment:

Students will research and write an essay of 700 - 1,000 words on: "Providing an affordable green living space for people who have lost their home due to a disaster or financial emergency." The living space should use sustainable materials, have a low-carbon emissions footprint, and achieve the "Green Ideals" of energy efficient building.

The living space design must consider the social, economic and ecological impact of the manufacturing and construction techniques. It should be constructed with the ideal of providing affordable homes to those facing disaster or financial crisis, and earning only 50% - 80% of the median income of the surrounding city.

The focus of this essay is meant to be on the green living space design. However, engineering is about more than designing a solution to a problem. The "problem" is often rooted much deeper in a societal need, or other less tangible issue. Engineering, in its purest essence, is about helping others, helping people, and making the world around us a better place. In order for students to see that aspect of engineering, the essay statement includes a societal need for the green building solution. With increasing numbers of people facing a housing crisis, because of homelessness or the recent foreclosure issues, this particular problem of designing a living space is rooted in assisting those facing a housing crisis. Therefore, we wish the student to focus on the living space design, but with the realization that the need was created from this housing issue. It is not meant for the student essay to focus on the housing crisis in depth, or any more than is addressed in the accompanying rubric.

Essay Requirements:

- I. Select and define a living space of their choice (home, pod, orb, high rise, etc) using "green" materials, processes and standards. The living space must be easily expandable to accommodate various living requirements. It should also support the needs of the elderly or persons with disabilities. Students must:

- Define the living space type.

- Define the location of the living space within a city as pertains to quality of life, access to city amenities, and the needs of its citizens (e.g. homeless).
- Explain how the living space can be expanded (or reduced), the style of space created (stand alone, multi-family, clustered, etc), and the expected life of the housing.
- Explain the target demographic of the housing.

- II. Research and analyze existing green building sustainable processes, materials, and technologies. Current aspects of some of the following topics should be investigated.

- Residential design
- Manufacturing and construction processes
- Materials and technologies for a living space
- Interior and exterior design features
- Processes in each element of the construction that assure a low-carbon footprint
- Innovations to create the living space
- Impact on landfill by the construction materials selected
- Methods to maximize the use of sustainable materials while maintaining a level of comfort or lifestyle quality of the inhabitants
- Locally sourced or recycled materials

- III. Develop and investigate a new technology or improvement to a technology researched above to incorporate to the residential space to insure sustainable/green design. The technology or innovation should aim to satisfy the Materials and Resources "Green Ideal" as outlined below. Explain:

- What specific innovation in Materials and Resources is achieved?
- How the innovation will function?

- What key sustainable methods or materials were incorporated in the design?
- How do these material choices enable your building to fit within the community?
- What is the impact of your material on construction waste?
- How does your green material choice impact the appearance (exterior or interior) of your building?
- What makes your material innovation a good economic, efficient and sustainable choice?
- What tradeoffs were made to accommodate the economics of constructing your green living space?
- What is the environmental footprint or impact of your design?

IV. Describe in detail:

- How is the living space easily maintained?
- How does this design improve the quality of life of the occupants?
- How does this design improve the quality of the community?
- What are the key features and benefits of your design and its impact on the community, residents, or environment?

V. Discuss the role of the engineer:

- Identify a discipline of engineering.
- How does the engineer contribute to the development of the living space or some of its components?

VI. Demonstrate written communication skills:

- The essay will be evaluated on written organization, grammar, and spelling.

BACKGROUND INFORMATION

GREEN IDEALS:

Green building and LEED criteria are briefly encapsulated in the “Green Ideals” outlined below.

In general, green building is a far reaching process and methodology that encompasses the location, construction, and functioning of the building. While there are many topics designers, manufacturers and construction professionals of green buildings must consider (listed below), for the purpose of the essay requirement, students are asked to focus on Materials and Resources as outlined below.

Sustainable sites

- Access to public transportation
- Carpooling resources
- Reuse of existing buildings or developed land

Water

- Water use reduction features
- Water-efficient landscaping
- Innovative waste water technologies
- Storm-water management

Materials and resources

- Collection and storage of recyclables
- Reuse and recycling of previously used materials for construction
- Use of local materials
- Use of rapidly renewable materials
- Certified wood
- Zero- or low-VOC (volatile organic compound) paints, resins, glues and other materials
- Construction waste management
- Environmentally preferable material

Energy and pollution

- Use of renewable energy
- Hot water
- High performance windows and insulation
- Lighting, heating, and cooling
- High-efficiency appliances
- Daylight views
- Reduce heat islands
- Light pollution reduction

Helpful resources:

- National Association of Home Builders’ (NAHB) model green home building guidelines, (www.nahbgreen.org)
- Leadership in Energy and Environmental Design (LEED) from the U.S. Green Building Council, (www.usgbc.org)
- World Business Council for Sustainable Development. www.wbcsc.org