

IMPORTANT: PLEASE READ!!!

2012 Widget Contest

National Engineers Week

Sponsored by: Gateway to Science & North Dakota Society of Professional Engineers, Chapter 3

Who can compete? Teams of 3 to 6 students, grades 9-12

Important Dates

Register and pick up kits (with \$10 deposit, at Gateway to Science): January 5 – January 25
Contest: Tuesday, February 7 at 5:30 p.m. at the Bismarck Public Schools Career Academy, 1221 College Drive, Bismarck. Arrive early!

Objective: Design a widget that does a certain task in as many steps as possible using only the provided materials, within a specified amount of time.

What are the prizes? The top three teams will earn cash prizes: \$200 for 1st place, \$100 for 2nd place, and \$75 for 3rd place. First place winners will also be invited to attend the National Engineers Week dinner with the local Society of Professional Engineers. Their winning widget will be on display and demonstrated at the dinner.

What is a Widget? A widget is a machine that combines science, engineering, and creativity with hints of absurdity and silliness. The widget performs a specific function in as many convoluted steps as possible without human intervention, except to activate it.

What is this year's task? Knock over a pyramid of three clear plastic 16 oz. cups. The three cups must be in a standard pyramid formation (Diagram 2) on the template provided for the base (Diagram 1) at the beginning of each run. All three cups must be knocked off their rims by an impact, not just moved or pulled apart.

Widget Specifications:

- Teams may begin designing and building their widget as soon as they pick up the materials.
- All provided materials, including the box, are eligible to be part of the widget. No other materials may be used.
- The tools included in your kit may be used in the process of constructing your widget, but may not be part of the widget itself. No other tools may be used.
- The materials may be modified, such as cutting paper towel tubes or unbending paper clips. However, the modifications may only be done using the provided tools and must be done within the time constraints of the contest.
- The tables that will be used are the long, rectangular type and measure 30" tall and 30" wide. Two teams will work at each table, one on each end. Thus, each team will have 3 table edges and 1 marked-off line on the tabletop. No part of the widget may cross the line marked on the tabletop.
- The widget must fit on a table surface of 30" square and cannot touch a wall or ceiling. The table corners are partially rounded, so your working surface will not be a perfect square.
- You may suspend a portion of your machine from the edge of the table, but it may NOT touch the floor.
- Following the initial activation, the widget must be self-activating. The ideal widget will run from beginning to end with no human intervention, except to get it started at the beginning.

(continued on reverse side)

- When the widget is activated (even if it does not go to completion), it counts as one of the two runs. “Redo”s are not allowed. If the run does not go to completion, the team may intervene by touching/fixing the widget and continuing the run from the place of interruption. As noted on the judging sheet, points will be lost for each human intervention, as well as for skipped steps.
- No construction materials will be replaced during the contest unless materials are determined to be defective by the judges.

List of Steps

Teams must submit a “list of steps” at check-in on the contest date. There must be 3 copies of the “list of steps”, one for the team’s use and two for the judges.

List of Steps must:

- Clearly describe each step that their widget machine makes. The first step will be the method of activation. (Example: “Step 4: The last domino knocks over the small cup.”)
- Each step must be numbered, in a consecutive order.
- Each step must be unique, unlike any other step.

Engineering Drawings

Teams must submit “engineering drawings” on the contest date. There must be 3 complete sets of drawings: one for the team’s use and two for the judges.

Drawings must:

- Show all dimensions, angles, and other crucial information for construction of your widget.
- Include top and profile views (all four sides)

Drawings may be done by hand or by using a program such as CAD. Photographs may be also submitted, but they do **not** take the place of drawings. Any design changes during construction on the contest day should be added to the drawings and explained to the judges.

On the contest day:

Bring used & unused materials, tools, engineering drawings (3 sets), and list of steps (3 sets).

Team members will use their engineering drawings to reconstruct their widget with a **new** set of materials during a period of **one hour**. Then, each team will **explain** their design to the judges with all members of the team contributing to the explanation. Each team will have **two** timed trials within ten minutes. This time period includes time between the first and second trial for modifications. Only team members will be allowed to participate in the construction and modification portions on the day of the contest.

Judging: The total score will be based on the team presentation, number of unique steps, success of two trials without human intervention, goal accuracy, and completion of the two trials within the 10-minute time allowance. See attached judging form for details.

Can teams have adult mentors?

Yes, teachers and/or other mentors may assist with the design and initial construction. However, only team members are allowed in the actual contest construction. Adult mentors are not allowed to participate, make suggestions, or answer questions during the contest.

What is the purpose of the contest? The goal is to encourage students from diverse backgrounds to consider careers in engineering and technology. Additionally, the contest helps to foster:

- Better understanding of scientific principles through hands-on application
- Experience working and solving problems as a team
- Improved presentation skills by requiring an explanation of the concepts and steps in each team’s widget
- Increased attention to detail and the ability to work from plans
- An appreciation of how engineers turn ideas into reality

ADDENDUM TO RULES

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Original Judging Section: The total score will be based on the team presentation, number of unique steps, success of two trials without human intervention, goal accuracy, and completion of the two trials within the 10-minute time allowance. See attached judging form for details.

Addendum to Judging Section: There will be a final judging round. The highest ranking groups will do one additional run to make sure all judges see all the finalists to make their final rankings. In the event of a tie, the scores for “list of steps” and “engineering drawings” will be used as a tiebreaker.