



## **Theta Tau 2019 Rube Goldberg Invention Competition**

Dear Students and Organizations:

Theta Tau Professional Engineering Fraternity of the University of South Carolina welcomes you to be a part of our annual Rube Goldberg Invention Competition! The idea for this contest was developed from the creative cartoons of William Heath Robinson and Pulitzer Prize winning Ruben Lucious Goldberg. Both of these artists from the early 1900s created cartoons of simple tasks that were made into overly complicated machines by using everyday items.

Goldberg's cartoons sparked students' interest nationwide to replicate and in turn compete to design machines that use the most complex processes to complete the simplest of tasks. Competitions in this format were originally developed by the Phi Chapter of Theta Tau at Purdue University in 1949.

The Zeta Delta Chapter of Theta Tau challenges students to compete in The University of South Carolina's annual Rube Goldberg Invention Challenge. Working on a Rube Goldberg Machine is a great way to develop critical thinking and problem-solving skills in a non-traditional engineering environment. There will be a regular and junior competition to encourage participation from students of all ages. Participants will also get the opportunity to meet other students and discover a more light-hearted and humorous side of the world of engineering.

More information about this year's competition is provided in the Student Packet.

Please feel free to contact Hayley Hall, Philanthropy Committee Co-Chair of Theta Tau, at (803)-370-8632 or [hh3@email.sc.edu](mailto:hh3@email.sc.edu) should any questions arise!

Best of luck!

Alexandra Patterson and Hayley Hall  
ΘT Professional Engineering Fraternity



## Theta Tau 2019 Student Packet

### I. Competition Date:

- o March 30, 2019

### II. Competition Location:

- o The University of South Carolina, Swearingen Engineering Center.
  - o 301 Main St, Columbia, SC 29208

### III. Registration:

- o Teams can register at this link: <https://goo.gl/forms/PIS9UihaTY4E73TX2>, or by emailing [hh3@email.sc.edu](mailto:hh3@email.sc.edu).
- o Teams will also be assigned a mentor, who will act as a liaison. They will be able to answer any questions and offer advice and encouragement for the competition. If requested, they can meet with you throughout the building process to assist.

### IV. Team Restrictions:

- o Each team must have a minimum of two (2) members.
- o There is no limit on the number of members a team may have, however, the number of people allowed around the machines once the contest has begun may be limited because of space restrictions.
- o No team member should be older than 19.

### V. Design Challenge

- o Teams will be given a task to complete and build a machine throughout the semester to present on competition day.
- o The task assigned for our 2019 competition is: **Putting toothpaste on a toothbrush**
  - o For the junior competition: **Breaking an egg**
- o Teams are encouraged to be creative, complex, and incorporate themes into their machines as this emphasizes the spirit of Veeblefretzer.
- o The machine specifications are as follows:



## Regular Competition:

Goal: Put toothpaste on a toothbrush

Machine must complete tasks as described to Chairman.

Minimum number of steps*	15
Maximum number of steps	Unlimited
Minimum run time	2 Minutes
Maximum run time	Unlimited
Themes	Are encouraged
Maximum dimensions of machine	6 feet x 6 feet x 6 feet

## Junior Competition:

Goal: Break an Egg

Machine must complete tasks as described to Chairman.

Minimum number of steps*	10
Maximum number of steps	Unlimited
Minimum run time	45 seconds
Maximum run time	Unlimited
Themes	Are encouraged
Maximum dimensions of machine	6 feet x 6 feet x 6 feet

\*A step is defined as a complete transfer of energy. i.e. 49 dominos knocking over a ball, counts as one step, not 50.

## VI. Safety:

- o Safety is held to the utmost importance.
- o Questionable items used in the machine must be approved by the contest site Chairman prior to the contest. If you think you need to ask if it is okay to use, ask.
- o Objects that are not allowed in the competition include:
  - o Live Animals
  - o Electric arcing
  - o Use of profane/indecent expression
  - o Objects flying beyond machine boundary (does not include steam/gas)

## VII. Prizes:

- o There will be a winner and runner up for each challenge (regular and junior.)
- o The winner of each will receive a trophy and a certificate.



## VIII. Logistics:

- o Set up will begin at 11:00, and participants will have one hour to set up.
- o A lunch of pizza and water will be provided at 12:00.
- o Judging will begin at 12:45, and an awards ceremony will follow.

## IX. Judging Criteria

Judging will be based on a **100 point scale** broken down into the following categories:

- I. General Impressions (40 points)
  - a. Theme (0 to 10 points)
  - b. Creativity (0 to 10 points)
  - c. Presentation (0 to 20 points)
- II. Timing (30 points)
  - a. Run Length (0 to 10 points)
  - b. First Run Length (0 to 10 points)
  - c. Second Run Length (0 to 10 points)
- III. Run Related (30 points)
  - a. Completed Task – Run One (0 to 15 points)
  - b. Completed Task – Run Two (0 to 15 points)
  - c. Human Interventions (-5 points each)
  - d. Objects Leaving Machine (-5 points each)



## Normal Competition

Team Name \_\_\_\_\_ Judge \_\_\_\_\_

### **General Impression (total of 0 to 40 pts)**

#### I. Theme (total of 0 to 10 pts)

- The machine incorporates a theme. (0 to 5 pts) \_\_\_\_\_
- Each step conforms to a theme. (0 to 5pts) \_\_\_\_\_

#### II. Creativity (total of 0 to 20 pts)

- Materials used for the machine appear to be found rather than bought. (0 to 5 pts) \_\_\_\_\_
- The steps are innovative and unique. (0 to 5 pts) \_\_\_\_\_
- The steps flowed in a series rather than branching out in parallel. (0 to 2 pts) \_\_\_\_\_
- At least 15 steps were incorporated into the machine. (0 to 8 pts) \_\_\_\_\_

#### III. Presentation (0 to 10 pts)

- Clear and concise verbal presentation of machine (0 to 5 pts) \_\_\_\_\_
- The team had the ability to answer questions and explain their machine. (0 to 5 pts) \_\_\_\_\_

**General Impression Total:** \_\_\_\_\_

### **Total Timing (total of 0 to 30 pts)**

#### I. Run Length (0 to 10 points for each run)

No points received if out of time range (<2 minutes)

Points for Run 1 \_\_\_\_\_

Points for Run 2 \_\_\_\_\_

#### II. First Run length (0 to 10 pts)

The predicted run length was close to the actual run length.

(1min difference = 5 pts deducted)

(Each 20 second difference = 1 pt deducted)

Predicted Run Length \_\_\_\_\_

Actual Run Length \_\_\_\_\_

Difference in Duration \_\_\_\_\_

#### III. Second Run length (0 to 10 pts)



The predicted run length was close to the actual run length.

(1 min difference = 5 pts deducted)

(Each 20 second difference = 1 pt deducted)

Predicted Run Length \_\_\_\_\_

Actual Run Length \_\_\_\_\_

Difference in Duration \_\_\_\_\_

**Timing Total:** \_\_\_\_\_

**Run Related (0 to 30 pts)**

**I. Completed Task (Run 1)**

If task is completed, 15 pts \_\_\_\_\_

If half the steps are completed, 10 pts \_\_\_\_\_

If less than half the steps are completed 0 pts \_\_\_\_\_

**II. Completed Task (Run 2)**

If task is completed, 15 pts \_\_\_\_\_

If half the steps are completed, 10 pts \_\_\_\_\_

If less than half the steps are completed 0 pts \_\_\_\_\_

**III. Human Intervention (-5 pts each)**

Run 1 \_\_\_\_\_

Run 2 \_\_\_\_\_

**IV. Objects outside of 6'x6' area (-3 pts each object)**

Run 1 \_\_\_\_\_

Run 2 \_\_\_\_\_

**V. Extra points if toothpaste is only on toothbrush bristles (5 pts each)**

Run 1 \_\_\_\_\_

Run 2 \_\_\_\_\_

**Run Total:** \_\_\_\_\_

**Grand Total:** \_\_\_\_\_



## Junior Competition

Team Name \_\_\_\_\_ Judge \_\_\_\_\_

### **General Impression (total of 0 to 40 pts)**

#### I. Theme (total of 0 to 10 pts)

- The machine incorporates a theme. (0 to 5 pts) \_\_\_\_\_
- Each step conforms to a theme. (0 to 5pts) \_\_\_\_\_

#### II. Creativity (total of 0 to 20 pts)

- Materials used for the machine appear to be found rather than bought. (0 to 5 pts) \_\_\_\_\_
- The steps are innovative and unique. (0 to 5 pts) \_\_\_\_\_
- The steps flowed in a series rather than branching out in parallel. (0 to 2 pts) \_\_\_\_\_
- At least 10 steps were incorporated into the machine. (0 to 8 pts) \_\_\_\_\_

#### III. Presentation (0 to 10 pts)

- Clear and concise verbal presentation of machine (0 to 5 pts) \_\_\_\_\_
- The team had the ability to answer questions and explain their machine. (0 to 5 pts) \_\_\_\_\_

**General Impression Total:** \_\_\_\_\_

### **Total Timing (total of 0 to 30 pts)**

#### I. Run Length (0 to 10 points for each run)

No points received if out of time range (<45 seconds)

Points for Run 1 \_\_\_\_\_

Points for Run 2 \_\_\_\_\_

#### II. First Run length (0 to 10 pts)

The predicted run length was close to the actual run length.

(Each 20 second difference = 1 pt deducted)

Predicted Run Length \_\_\_\_\_

Actual Run Length \_\_\_\_\_

Difference in Duration \_\_\_\_\_

#### III. Second Run length (0 to 10 pts)

The predicted run length was close to the actual run length.



(Each 20 second difference = 1 pt deducted)

Predicted Run Length \_\_\_\_\_

Actual Run Length \_\_\_\_\_

Difference in Duration \_\_\_\_\_

**Timing Total:** \_\_\_\_\_

**Run Related (0 to 30 pts)**

I. Completed Task (Run 1)

If task is completed, 15 pts \_\_\_\_\_

If half the steps are completed, 10 pts \_\_\_\_\_

If less than half the steps are completed 0 pts \_\_\_\_\_

II. Completed Task (Run 2)

If task is completed, 15 pts \_\_\_\_\_

If half the steps are completed, 10 pts \_\_\_\_\_

If less than half the steps are completed 0 pts \_\_\_\_\_

III. Human Intervention (-5 pts each)

Run 1 \_\_\_\_\_

Run 2 \_\_\_\_\_

IV. Objects outside of 6'x6' area (-3 pts each object)

Run 1 \_\_\_\_\_

Run 2 \_\_\_\_\_

V. Extra points if yolk remains intact (5 pts each)

Run 1 \_\_\_\_\_

Run 2 \_\_\_\_\_

**Run Total:** \_\_\_\_\_

**Grand Total:** \_\_\_\_\_