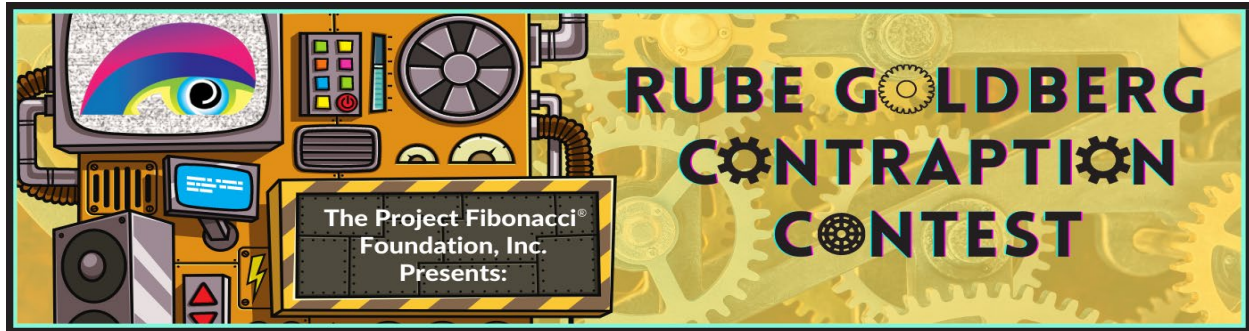


## Rube Goldberg Contraption Contest Frequently Asked Questions



### What are the four age categories of contestants?

- Little Person/People – currently in grades K-2
- Elementary Student/Team – currently in grades 3-5
- Middle Level Student/Team – currently in grades 6-8
- High School Student/Team – currently in grades 9-12

### What are the prizes?

- Little Person/People – \$200 gift certificate
- Elementary Student/Team – \$200 gift certificate
- Middle Level Student/Team – \$200 gift certificate
- High School Student/Team – \$200 gift certificate

### Can two or more of us enter as a team?

Yes, up to four people may team together to enter one solution, however there are two important stipulations:

- All members of the team must be within the same age category. For instance, whereas a parent and child cannot enter as a team, siblings or classmates within the same grade band may enter as a team.
- Members of the team must split the prize should they win.

### Can an individual contestant or team engage with experts, teachers, or others outside of the team?

Yes, with an important distinction: Experts and others may be consulted about the project but may not assist in the design or construction of the Rube Goldberg Machine. Final decisions about the design of the machine and the actual building of the machine must be done by contestants only.

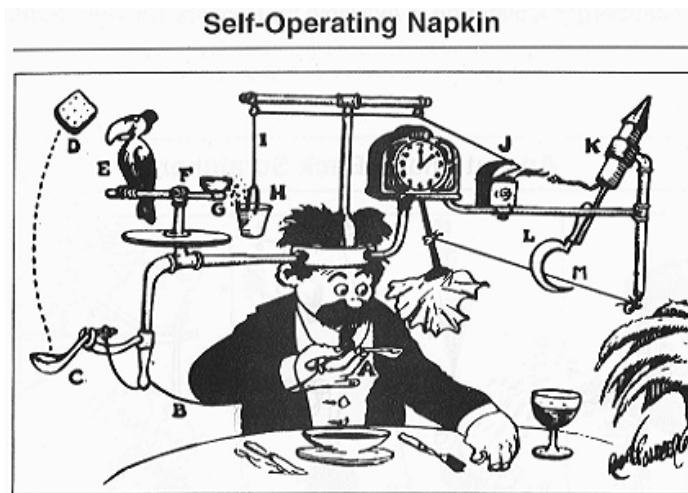
### Can you give us some background on Rube Goldberg machines?

Certainly!

Rube Goldberg, who lived from 1883-1970, was a scientist and cartoonist who satirized people's overly complicated solutions to problems. In his cartoons he portrayed chain reactions with simple machines to complete very basic tasks such as filling a dog bowl with food or watering a plant. His designs always performed a simple task but used over-engineered and complicated processes to accomplish the task.

## Rube Goldberg Contraction Contest Frequently Asked Questions

Below is a cartoon drawn by Rube Goldberg for his “self-operating napkin”. Look online for more of his amusing cartoons!

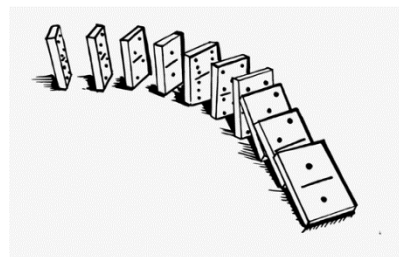


In Rube Goldberg’s “**Self-Operating Napkin**”, the chain reaction begins when the soup spoon (**A**) is raised to “Professor Butts” mouth, pulling string (**B**), and thereby jerking ladle (**C**), which throws the cracker (**D**) past the parrot (**E**). The parrot jumps after the cracker, causing the perch (**F**) to tilt, upsetting seeds (**G**) into the pail (**H**). The extra weight in the pail pulls a cord (**I**), which opens and lights an automatic cigar lighter (**J**), setting off the rocket (**K**), which causes the sickle (**L**) to cut the string (**M**) and allows the pendulum with the attached napkin to swing back and forth, wiping Professor Butts’ chin. Task completed!

Better still, here is a terrifically entertaining video that demonstrates Rube Goldberg contraptions. It is titled, “This Man is a Professional Useless Machine Builder.”

Watch Here: <https://www.youtube.com/watch?v=IWIGo2FOaJk>

### Can you tell me more about chain reactions and simple machines?



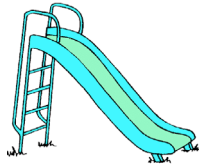
A chain reaction occurs when one action causes one or more additional actions. An example is pushing the first of many aligned dominoes, causing successive dominoes to be pushed over. Eventually, all dominoes will be pushed over, if aligned within a close enough proximity.

**Simple machines** reduce the amount of energy or effort needed to complete a task., such as lifting a heavy object or moving an object to another location or elevation.

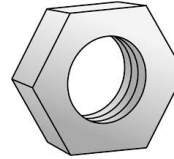
# Rube Goldberg Contraption Contest Frequently Asked Questions

The six “simple machines” are:

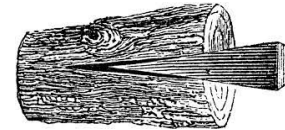
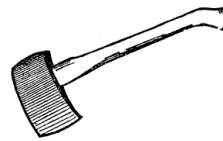
1. **Inclined Plane**



2. **Screw**



3. **Wedge**



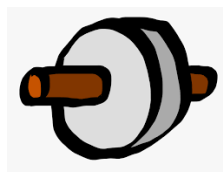
4. **Lever**



5. **Pulley**



6. **Wheel and Axle**



## What are the requirements I must meet in my Rube Goldberg Machine?

There are TWO requirements you must incorporate into the design and construction of your contraption: #1 simple machines; and #2 chain reactions.

### Requirement #1: Simple machines

Little Person/People Category (K-2) – Two or more of the six simple machines must be incorporated into the Rube Goldberg Contraption. The same simple machine(s) may be used as many times as desired, but it is not required to repeat its use. For example, two inclined planes may be used in combination with a lever.

## Rube Goldberg Contraption Contest Frequently Asked Questions

Elementary Category (3-5) – Three or more of the six simple machines must be incorporated into the Rube Goldberg Contraption. One simple machine must be repeated and may be used as many times as desired. For example, two inclined planes may be used with a lever and a pulley.

Middle Level Category (6-8) – Four or more of the six simple machines must be incorporated into the Rube Goldberg Contraption. Two simple machines must be repeated and may be used as many times as desired. For example, two inclined planes may be used with two levers, a pulley, and a wheel and axel.

High School Category (9-12) – Five of the six simple machines must be incorporated into the Rube Goldberg Contraption. Three of the simple machines must be repeated and may be used as many times as desired. For example, two inclined planes may be used with two levers, two pulleys, a wheel and axel, and a wedge.

*Please note: The above examples are illustrative only and note required configurations! You my use any combination of simple machines and any number of them as desired.*

### Requirement #2: Chain Reactions

Chain Reactions must be incorporated into the Rube Goldberg Contraption. After all, that is a defining feature! A simple and singular activation by the inventor must set into motion a series of chain reactions causing the components to do their work, and ultimately causing the Rube Goldberg machine to accomplish its task (as basic as that may be!)

### What task must my Rube Goldberg machine be able to do?

Your Rube Goldberg machine must complete a “basic task”. Students are to select a task from the list provided for their age group.

#### Little Person/People – Pre-K-grade 2:

- Erase a chalkboard or whiteboard.
- Turn off a light switch, lamp, or flashlight.
- Shut off an alarm on a clock, smart phone, or device.
- Turn on a radio or play music on a device.
- Drop a ball into a container.
- Hang a decoration on a tree.

#### Elementary Student/Team – grades 3-5:

- Open an umbrella.
- Put money in a piggy bank.
- Zip a zipper (or unzip a zipper)
- Put the lid on a jar.
- Screw a lid on a jar.
- Feed a marshmallow to someone.

# Rube Goldberg Contraption Contest Frequently Asked Questions

## Middle Level Student/Team – grades 6-8:

- Dispense hand sanitizer into a hand.
- Screw a light bulb into a socket or lamp.
- Sharpen a pencil.
- Inflate a balloon.
- Pop a balloon
- Squeeze toothpaste onto a toothbrush

## High School Student/Team grades 9-12:

- Squeeze the juice from an orange or lemon.
- Apply a Band-Aid to an arm, leg, or head.
- Crush a soft drink can.
- Unlock a combination lock.
- Adhere a stamp to a letter.
- Feed someone school lunch Put shaving cream on a face.

## How do I get started? And how do I enter the contest?

With your team (or by yourself):

Enter the contest by having your teacher or an adult (age 18 or over) contact Maria Smith, Educational Programs Advisor, at [msmith@projectfibonacci.org](mailto:msmith@projectfibonacci.org). Give her your/your team's name(s), grade category, and contact info. She will answer any questions you might have about the contest.

*Follow the engineering design process to make your Rube Goldberg Contraption:*

## Research

- Look at some Rube Goldberg machines on YouTube. There are thousands!
- Select a basic task for your machine to accomplish.
- Gather all kinds of “stuff” that could be used in the construction of your machine: Tubes, golf balls, dominoes, cardboard, magnets, funnels, toy train tracks, miniature cars, CDs, Legos – gather more stuff than you think you will need. Take apart things (with parent permission, kids) that do not work anymore. You will likely find simple machines inside that will give you ideas or to use as components in your machine.

## Design

- Brainstorm ideas! This is fun! Keep a list of your ideas.
- Make several sketches of your contraption and its component workings. Show how the different parts will cause the chain reactions to happen and how the final task will be accomplished. Be flexible and consider multiple solutions. Be realistic. Your machine must function!

# Rube Goldberg Contraption Contest Frequently Asked Questions

## Construct & Test

- Construct the components of your machine. That is, figure out how the simple machines will interact, causing a series of chain reactions.
- Test each component as you go. How does it work? Can improvements be made? Most engineers consider many different solutions to accomplish the desired result. You should, too!
- Expect to have to modify your design to improve your contraption's performance or its efficiency. This stage may take the longest to ensure that the machine works consistently well and accomplishes the task.

**Be patient and enjoy the experimentation!**

## Share your Results!

Name your contraption. Be creative!

Make a video of yourself, your team, and your machine:

- Introduce yourself and/or the team. Tell us your name(s), where you go to school, and grade level.
- Tell us the name of your contraption.
- Tell us if you consulted with a teacher, expert, or others and who they are. Give credit to those who supported you!
- Explain the simple task that the machine will accomplish (for example, "water a plant").
- Take us through a verbal description of the chain reactions that will take place to accomplish the task. You may use your sketch to do so (provide close-ups), or the actual machine, pointing us to the components along the way.
- Demonstrate the machine for us. You may use slow motion videography and/or demonstrate the machine more than once for viewers (or to amuse them!)
- Save your video in MP4 format. It does not need to be long – 2-4 minutes at most - but should respond to the requirements in the bullets above.

## Where do I/we submit my/our video?

Please email videos to Maria Smith at [msmith@projectfibonacci.org](mailto:msmith@projectfibonacci.org)

*Important: Children under the age of 18 must also submit written permission from a parent granting permission for Project Fibonacci to post your video to our Facebook page and to acknowledge you as the inventor. Permission(s) may be emailed separately or at the same time as the video submission.*

All videos become the property of The Project Fibonacci® Foundation and may be used for promotion and/or in future media productions.

## When is my video due and when will I know if I won?

(Exact due dates to be determined.) All entries will be acknowledged within 24 hours of submission. If your video is selected for posting to Project Fibonacci's Facebook page, you will be notified prior to its posting. You will also be notified of the time frame for the posting of your video.

## ***Rube Goldberg Contraption Contest Frequently Asked Questions***

Once posted, contact friends, family, and classmates to visit Project Fibonacci® Foundation Facebook page and “like” your video. Remember that the videos with the most likes win first place prizes!



project   
**FIBONACCI**<sup>®</sup>  
FOUNDATION, INC.

***Enriched STEAM Communities  
Driving a Modern Renaissance***