RUBE GOLDBERG

OVERVIEW

Using leadership and 21st century skills, participants design and build a contraption which accomplishes a simple task using multiple steps and all six simple machines to transfer energy and motion.

ELIGIBILITY

Entries are limited to one (1) team of a minimum of three individuals. Each team must have at least 3 members and no more than 12 members. Only six (6) members may be in the building area at any one time.

TIME

Build time will be four (4) hours. Team members can trade in and out for lunch breaks and to participate in other events. If a team does not have replacement members, they will be allowed to stop building. They must notify the event coordinator so a stop time can be noted. They must return to the event as soon as possible to start building. No builds will start after the official start time noted in the conference schedule.

ATTIRE

TSA competition attire is required.

PREPARATION

A. Participants prepare their documentation prior to the conference according to the regulations.

REGULATIONS AND REQUIREMENTS

Students will work to develop their leadership and 21st century skills in the process of preparing for and participating in this Oklahoma TSA competitive event. The development and application of those skills must be evident in their submission, demonstration, and or communication pertaining to the entry.

PRELIMINARY ROUND

A. Participants design and build a Rube Goldberg mechanical device.

B. This device will contain four (4) subsystems that when combined make up a larger system.

   a. Each subsystem will contain only two (2) types of simple machines in a fun and inventive way

   b. Each type of simple machine must be used at least twice in the subsystem in which it is placed.

   c. All six (6) simple machines must be represented in the final subsystem.

   d. The transfer of energy in your device will travel a specific path from start to finish for a **minimum** of seven (7) seconds per board.

C. The device must be self-powered utilizing kinetic energy after the initial touch that starts the device.

   a. No human intervention after the device has started.

   b. Counter weights can be used but must be a part of the original design.

   c. No batteries or electric power can be used.

D. The device must be capable of repeated demonstrations with the reset time for the entire system to be less than three (3) minutes.

E. The final solution is open ended to maximize your creativity.

PROCEDURE

A. All building must take place at the competition. Pre-built parts or assemblies will result in disqualification.

B. Documentation Portfolio

1. The portfolio must include the following pages stapled together in the following order.

   a. Cover page – must include the event title, the year, and the participants team number.

   b. Design Drawings

   - One (1) drawing must be turned in for each subsystem (total of four (4) drawings)
   - Simple machines must be labeled in each drawing.

   c. Materials list must be included.

C. Sub-System Boards

1. Must have four (4) subsystems
2. The size of each sub system must not exceed 12” wide x 12” deep x 18” tall.
3. The entire system must fit within an area of 24” wide x 24” deep x 18” tall.
4. Each subsystem should be self-contained to its own 12”x12” base made from a material of your choice. Please refer to the diagram below for a visual reference

D. Materials – safety glasses must be worn at all times

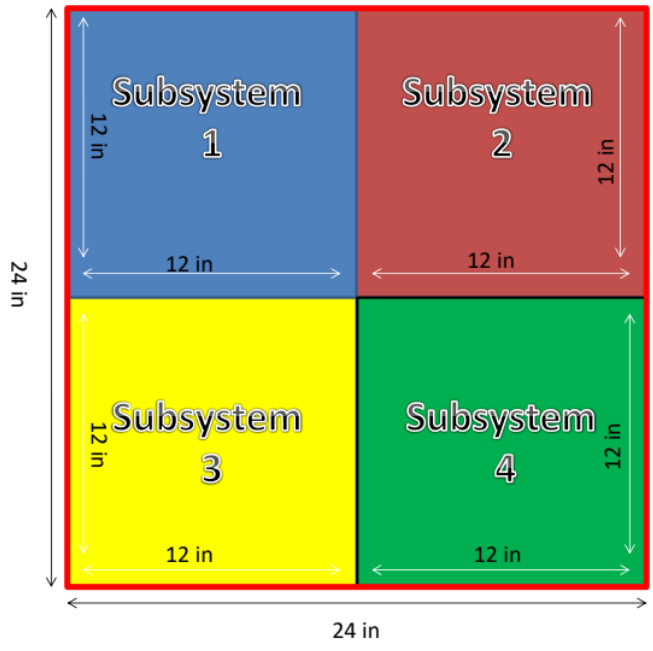
1. Teams must supply their own materials and tools
2. Teams must supply their own extension cords and or power strips
3. No power tools or battery powered tools are allowed.

EVALUATION

Each machine will be judged on two (2) runs. Judges will score the best run with the fewest touches to keep the contraption moving. The BEST of the two (2) runs will be the score recorded. Only three (3) students selected by their team will be allowed in the judging area to set up and start the Rube Goldberg.

STEM INTEGRATION

This event has connections with the STEM (Science, Technology, Engineering, and Mathematics) educational standards.



Participant/Team ID# _____

RUBE GOLDBERG

2022 OFFICIAL RATING FORM

MIDDLE SCHOOL

Judges: Using minimal (1-4 points), adequate (5-8 points), or exemplary (9-10 points) performance levels as a guideline in the rating form, record the scores earned for the event criteria in the column spaces to the right. The X1 or X2 notation in the criteria column is a multiplier factor for determining the points earned. (Example: an "adequate" score of 7 for an X1 criterion = 7 points; and "adequate" score of 7 for an X2 criterion = 14 points.)

Go/No Go Specifications

- Before judging the entry, ensure that the items below are present; indicate presence with a check mark in the box.
- If an item is missing, leave the box next to the item blank and place a check mark in the box labeled ENTRY NOT EVALUATED.
- If a check mark is placed in the ENTRY NOT EVALUATED box, the entry is not to be judged.

☐ Drawings are present.
☐ Materials and safety glasses are present.
☐ ENTRY NOT EVALUATED

MECHANICAL DEVICE (80 points)				
CRITERIA	**Minimal performance**	**Adequate performance**	**Exemplary performance**	**Record scores in the column spaces below**
	1-4 points	5-8 points	9-10 points	
Machine Types (X2)	Includes at least 3 simple machine types. Some machines are not used as true simple machines.	Includes at least 4 machine types. Each machine is used as a true simple machine, but some machines may repeat.	Includes all 6 simple machines. Each machine is used as a true, different simple machine.	
Machine Process (X2)	Includes at least 9 steps to accomplish the task, but many steps seem to blend together.	Includes at least 12 steps to accomplish the task, but a few steps seem to blend together.	Includes at least 18 distinct and separate steps to accomplish the task.	
Reliability (X2)	Machine does not really work.	Machine works for most of the runs, some human intervention is necessary.	Machine works reliably every time and does not require human intervention.	
Creativity (X2)	A straightforward implementation.	A Rube Goldberg Apprentice! Interesting but no "wows!"	Rube Goldberg Master! A novel and amusing idea!	
Time and Space (X2)	Machine is oversized and outside of time constraints.	Machine is oversized, but within time limits.	Machine runs between 28 and 60 seconds and is within size limits.	
			PROJECT SUBTOTAL (100 POINTS)	

DOCUMENTATION (40 points)				
CRITERIA	**Minimal performance**	**Adequate performance**	**Exemplary performance**	**Record scores in the column spaces below**
	1-4 points	5-8 points	9-10 points	
Design Drawings (X1)	Drawing are unclear.	Project is drawn appropriately.	Clear and concise drawing of the project.	
List of materials and tools used (X1)	List of materials and tools is not included.	Partial list of materials and/or tools is included.	Complete list of materials and tools is included.	
			DOCUMENTATION SUBTOTAL (20 POINTS)	
			To arrive at the total score, add subtotals TOTAL (120 points)	