

# Contrapt Wisconsin

# Roll the dice

WAUKESHA 4.26.24 | MILWAUKEE 5.10.24



WAUKESHA  
COUNTY TECHNICAL  
COLLEGE



2024 Contrapt Wisconsin Competition Handbook

## 2024 Contrapt Wisconsin Competition

**ContraptWI** is STEM Forward's engaging middle school contraption competition. A contraption accomplishes a simple task in the most complicated, fun way possible. Building one can be challenging, but it allows students to work on skills involving engineering, simple machines, trial and error, project planning, physics, teamwork, and creativity. STEM Forward is honored to work with the Brauer Engineering STEM Team (BEST) to provide these competitions for middle school students.

**STEM Forward will host two ContraptWI Competitions for middle school students.**

- Friday, April 26, 2024 at Waukesha County Technical College
- Friday, May 10, 2024 at MSOE Kern Center

We look forward to having your school participate. This packet will provide information on getting involved and how the competition will be run. If you have questions, please contact Theresa Wolf, Program Manager at STEM Forward, at [twolf@STEMForward.org](mailto:twolf@STEMForward.org).

### 2024 Contrapt Challenge:



#### **IMPORTANT DATES for the 2024 Competitions**

- Registration: Register by April 1, 2024  
*Register early, as we will only accept up to 40 teams for WCTC and 45 teams for MSOE.*
- Team Names: Due by April 15, 2024
- Student Names and Media Waivers: Due April 22, 2024

## Rules

### Teams

Teams must consist of 3-5 students. Students must be in 5<sup>th</sup> – 8<sup>th</sup> grades.

### Number of Teams

Space is limited to 40 teams for WCTC and 45 teams for MSOE. Each school may bring 1-4 teams. If a school has more than four teams, please contact [Theresa Wolf](#) to see if space is available. We ask that teams plan to attend the competition closest to their school and encourage early registration to ensure you can compete. Registration will close when we reach our capacity. Schools may only compete in one of our two locations.

### Contraption Size

Contraptions must be placed on a table and not exceed the dimensions below. Contraptions will be measured with any moving parts extended to the longest measurement. Any parts attached to the contraption count, including the base, are part of the contraption size.

- Width: 25 inches
- Length: 50 inches
- Height: 36 inches

### Number of Steps

The contraption must have a minimum of 8 steps and no more than 20 steps.

## Definition of a Step

A step is a transfer of energy from one action to another action. Identical transfers of energy in succession are counted as one step. For example, a set of dominos hitting each other is one step. The final step must complete the task of [Rolling the Dice](#).

## Scoring of Steps

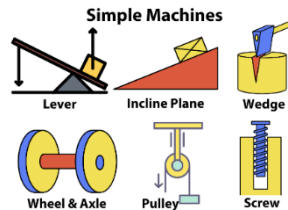
Below is the scoring breakdown for the number of steps in a contraption.

Contraption Steps	Maximum Pts = 10
Criteria	Points Awarded
1-7 and 21+ Steps	0
8-10 Steps	3
11-13 Steps	5
14-20 Steps	7
Turned in Step List	3

## Simple Machines

Teams may earn extra points by incorporating simple machines into their contraption. Any simple machines should be labeled on the step list to be counted. A step does not have to be a simple machine. The six simple machines are:

- Lever
- Inclined plane
- Wedge
- Wheel & Axle
- Pulley
- Screw



To count as a simple machine, it must perform work and be part of a step, not just be present. For reference, here is a link that explains simple machines: [Simple Machine for Kids: Science and Engineering for Children - Free School](#).

The screw can be the most challenging component for machines. A **screw** is a mechanism that converts [rotational](#) motion to [linear motion](#), and a [torque](#) (rotational force) to a linear [force](#). For instance, a spiral ramp that does not rotate is considered an inclined plane, not a screw. A screw must turn as part of the step.

## Scoring of Simple Machines

Below is the scoring breakdown for the number of simple machines in a contraption.

Number of Simple Machines	Maximum Pts = 10
Criteria	Points Awarded
No Simple Machines	0
1-2 Different Simple Machines	3
3-4 Different Simple Machines	5
5-6 Different Simple Machines	7
Included in Step List	3

## Interventions

If your contraption stops working, you must intervene to help it continue its run. Any physical touching or action to continue the operation of the contraption through human interaction after the run begins is an intervention. Each intervention is a 2-point penalty.

### Objects Leaving the Contraption

There is a 2-point penalty for any object that leaves the contraption dimensions. Objects include confetti, water droplets, etc.

### Batteries/Electricity:

Batteries may be used in the contraption. Electrical wires/cords can only be used when connected between a battery and an electrical device (such as a light, motor, fan, and relay). Electrical wires/cords cannot be used to connect to a wall outlet.

### List of Steps

Each team is to type out steps for their contraption. This should include the team name, school, and a numbered list of each step that makes up the contraption, highlighting the simple machines. This list is to be provided on competition day. Please print four (4) copies and provide one to the registration table, and one to each Lead Judge for the three rounds.

### Judging

Contraptions will be judged in three rounds by three different sets of judges. Teams will have a small break between sets of judges. Please see the included scoring rubric the judges will be using. Rolling the Dice should be the last step. Any steps after the task is completed will not be counted. The same **Judging Process** will be done each round:

- Students introduce themselves to the judges.
- Teams have up to two minutes to verbally walk the judges through the steps of their contraption.
- Teams run their contraption.
- Teams have up to 4 minutes to reset their contraption.
- Teams run their contraption a second time for the same judges.

### Tentative Event Hours

Teams can arrive at **8:45 AM to check in**, set up contraptions, and pick up t-shirts. Our competition will begin at **10:00 AM**. Each team will participate in multiple rounds of judging throughout the morning. After lunch, we will hold an awards ceremony. After the ceremony, teams pack up, clean their area, and **leave by 2:00 PM**.

### Lunch and T-Shirt

Students and teachers will be provided lunch. Each student will receive a t-shirt. Students and teachers are encouraged to bring a water bottle, drink, and/or snack. There will be vending machines available near the competition.

### Awards

Trophies will be presented to the 1<sup>st</sup> – 5<sup>th</sup> place teams. Special Awards will also be available – categories to be announced later.

### Clean-Up

Teams are responsible for removing their contraption and cleaning their area before leaving the event.

### Media Waivers

Each student must have a parent/guardian submit a Student Waiver & Guardian Consent Form before the competition. **Waivers will be completed online on the [STEM Forward Website](#).**

### Team Registration

Schools may register by completing the registration form found on the [STEM Forward Website](#). The registration fee is **\$50 per school**, and the registration deadline is **April 1, 2024**. Please get in touch with [Theresa Wolf](#) at STEM Forward with any questions.

**Good luck, and we look forward to seeing you at the competition!**

## 2024 Scoring Rubric

### Contraption Design / Build - 10 Points Max

Creative Use of Materials	1 to 5 Points
Creative Design	1 to 5 Points

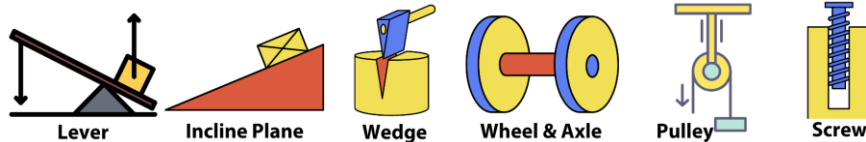
### Presentation - 10 Points Max

Team Presentation	1 to 5 Points
Team Spirit & Teamwork	1 to 5 Points

### Number of Steps - 10 Points Max

1-7 Steps or 21+ Steps	0 Points
8-10 Steps	3 Points
11-13 Steps	5 Points
14-20 Steps	7 Points
Submission of Step List? Y or N	0 or 3 Points

### Use of Simple Machines - 10 Points Max



No Simple Machines	0 Points
1-2 Different Simple Machines	3 Points
3-4 Different Simple Machines	5 Points
5-6 Different Machines	7 Points
Simple Machines Highlighted in Step List? Y or N	0 or 3 Points

### First Run - 10 Points Max

Task Completed - Y or N	0 or 10 Points
Number of Interventions	-2 for Each
Number of Objects Leaving Contraption	-2 for Each

### Second Run - 10 Points Max

Task Completed - Y or N	0 or 10 Points
Number of Interventions	-2 for Each
Number of Objects Leaving Contraption	-2 for Each

### Penalties

Presentation Time Exceeds 2 Minutes	-5 Points
First Run Time Exceeds 1 Minute	-2 Points
Reset Time Exceeds 4 Minutes	-5 Points
Second Run Time Exceeds 1 Minute	-2 Points
Any Dimension Exceeds the Limits (25" W x 50" L x 36" H)	-5 Points