

2025 Oklahoma SLSC State Additive Manufacturing Memo

NO SUBSTITUTIONS WILL BE ALLOWED AFTER FRIDAY, March 28th, 2025.
THERE WILL BE NO SUBSTITUTIONS ALLOWED ON-SITE AT THE CONFERENCE

Times/locations and general information

2025 Additive Manufacturing Memo will be at the Arvest Convention Center Contestants Monay, April 28th, 2025. Check in at the contest area at 8am in the Exhibit Hall.

ONLINE TESTING

Contestants will be judged on their SkillsUSA knowledge through Professional Development test. Testing will be completed online and proctored through their technology centers. Online testing opens March 14, 2025, and closes April 4, 2025.

RESUME- Change to submission type please for 2025 please read

All contestants will submit a digital resume prior to contest day. Contestants will receive an email to the address used to register the contestant for contest with instructions and link to access the SkillsUSA Competitor Portal page. The email will contain contestant's username and contestant number, which are required to login to the Competitor Portal.

Deadline to submit resume is April 22, 2025.

Contest Meeting

Meeting at 4 p.m., Sunday April 27st, in contest area. Students will turn in their engineering notebooks, final print of their project file for review by judges.

CLOTHING REQUIREMENTS

As in the past, skill contestants will not be penalized for not adhering to national clothing requirements. Contestants should not wear clothing that has school or identification visible to the judges.

CELLPHONES AND OTHER SMART DEVICES

Cellphones, electronic watches and/or other electronic devices not approved by a competition's technical committee are NOT allowed in the competition area. Please follow the guidelines in each technical standard for approved exceptions. Technical committee members may also approve exceptions onsite during the SkillsUSA Championships if deemed appropriate.

AWARDS CEREMONY

Winners will be recognized at the General Session on Tuesday morning, April 29th, at 9am at the Arvest Convention Center in the Grand Hall. All competitors must wear official SkillsUSA dress to the Awards Session, where winners are announced. Competitors who are not dressed appropriately or lack official attire will be denied access to the awards stage. Students must be present when their contest is announced. If a student is improperly dressed, absent, or misses their contest being called, the production will not be paused for any reason, and they will forfeit their opportunity to go on stage to receive the award. No exceptions will be made. No hats or sunglasses will be allowed to be worn on stage.

- Official dress for men: Official blazer, jacket or sweater; black dress slacks; white dress shirt; plain black tie with no pattern or SkillsUSA black tie; black socks and black shoes.
- Official dress for women: Official blazer, jacket or sweater; black dress slacks or knee-length skirt with business like white, collarless blouse or white blouse with small, plain collar that may not extend onto the lapels of the blazer, and black dress shoes.

INDUSTRY AWARDS

Prizes are the responsibility of the individual contests. Prizes are not guaranteed and are not supplied at the SkillsUSA Oklahoma state level.

Industry awards should be labeled with the name and address of the award supplier so that an appropriate "Thank you" may be sent, must be accompanied by an industry award donation information sheet (available on the Oklahoma SkillsUSA website) and be brought to the awards area in the Conference Hall on Sunday April 27th between 12:00pm & 4:00pm or Monday, April 28th 2025 between the hours of 8:00 am and 4:00pm.

SkillsUSA 2025 Additive Manufacturing State Challenge

Make It Run

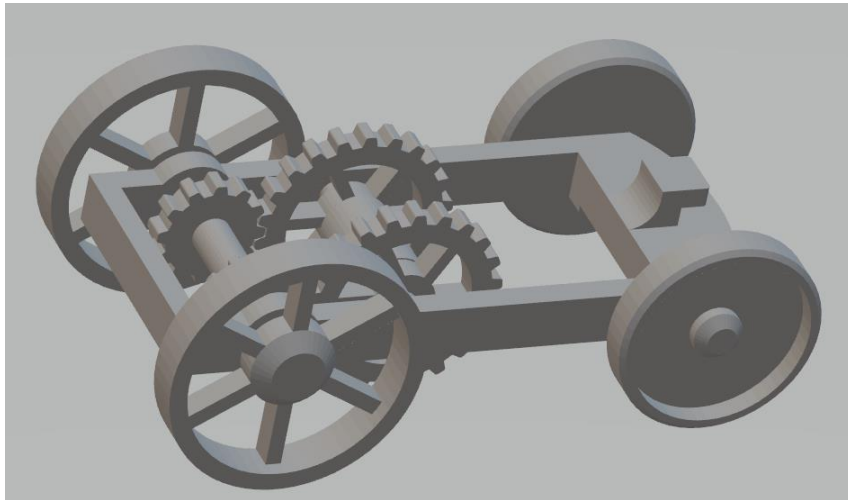
Welcome to the “Make It Run” challenge!

The task at hand is to design and fully print a 4 wheeled vehicle powered only by a single rubber band. The vehicles will then be tested on a “track” for functionality, and additional scoring.

Design Considerations:

- Interlocking parts
- Printed Assemblies
- Snap fits
- Printable Tolerances
- Motion
- Kinetic to Potential Energy

Example of Basic Design



Competition Requirements

1. The design **must** be completely 3D printed.
2. The design **must not** contain any outside hardware (axles, screws, washers)
3. The design **can** be 3d printed using any technology.
4. The design **must** contain a legibly printed team number/name
5. The design **can** contain 3D printed bodies that are assembled after printing for the final part.
6. The final design **can** use super glue for assembly, for a loss of points (see grading rubric)
7. Parts **must** have printed wheels

8. The design **must** contain at least 3 moving parts
9. Wheels **can not** be larger than 3 inches in diameter
10. The design **must** be powered only by a single rubber band
11. The printed design **must** have moving bodies.
12. The design **must not** exceed 6" x 4" x 4"
13. 3D Printed Design - Students **must** create a design that:
 - Is original and designed by contestant
 - Print all parts in less than **12** hours total
 - Uses less than **5** cubic inches of model and/or support combined for all parts.
14. Students **must** submit files to be printed via State designated file share site no later than **[TIME]** on **[SUBMISSION DATE]**. Final prints will be delivered on the day of the contest so that students can test, assemble/modify and be evaluated.

Tips for Competitors

Here are some tips to maximize the points awarded to you:

- Build debossed text on a horizontal surface for best results. This may require building the part on its edge or standing up.
- Utilize soluble support structures for print in place assemblies
- Understand the achievable design tolerance of your printer for print in place, or hand assembled designs to allow motion between parts.
- Leverage post-processing techniques to smooth printed bodies.
- Additional moving parts may add to your score but can produce more points of failure on the final assembly.
- Use online resources (YouTube, GrabCAD Tutorials)
- Whenever intellectual property (IP) deters you from a project, try using approximate geometries to communicate the design intent.
- Optional design for additive manufacturing learning resources:
 - Stratasys Think Additively™ Masterclass:
 - <https://youtube.com/playlist?list=PLUYaY5EIPtNBdU-s-7I9rI05IBHHITarI>

State Competition Procedure

Before or on contest day:

1. Students submit Engineering Notebook (Engineering notebook guidelines below)
2. Students submit print files in both CAD (.step, .iges, .sldprt, etc.) and mesh (STL, 3MF, OBJ, etc) format to **[State Designated File Share Site]**
3. Students submit physical parts
4. Students submit final assembly if applicable
5. Students submit their Presentation

State Competition Judging Criteria

1. The Engineering Notebook should contain robust content, including at a minimum the following:
 - 1.1. Be clearly labeled with contestant name(s), date and page # on each page
 - 1.2. Begin with a problem statement
 - 1.3. Include discovery and documentation of approach to solve problem
 - 1.4. Include sketched design concepts with critical features labeled
 - 1.5. Critical dimensions clearly labeled in design sketch
 - 1.6. Considerations for designing for additive manufacturing distinctly addressed (i.e. part strength, part orientation) especially including any expected risks during printing
 - 1.7. Screenshots of the print time and material usage for all printed parts
 - 1.8. Design decisions and alternatives are documented and evaluated thoughtfully

2. The design must adhere to the Competition Requirements stated in the prior page.

3. Quality of final assembly
 - 3.1. Does it perform the function in the manner it was designed to do?
 - 3.2. Does it meet all requirements in contest guidelines?
 - 3.3. Do inserted components or multiple printed parts mate together properly?
 - 3.4. Did the students design the part with additive manufacturing in mind?
 - 3.5. Is there sufficient tolerance between parts for movement?

4. The design must illustrate best practices for “design for additive manufacturing (DFAM)”. Below are some *potential* DFAM metrics to optimize for.
 - 4.1. Build Time
 - 4.2. Post-Processing/Support Removal Time
 - 4.3. Functionality Optimization (gear ratio, pliability, strength, etc.)
 - 4.4. Monetary Savings
 - 4.5. Material Consumption
 - 4.6. Energy Usage
 - 4.7. Component Consolidation (lack of store-bought hardware)
 - 4.8. Lightweighting for Ergonomics

5. **Presentation Criteria**
 - 5.1. The team clearly describes their understanding of the problem to be solved.
 - 5.2. Design Process: good design logic is used for key design choices. Intentional and well-communicated
 - 5.3. The presentation is professional and well-rehearsed
 - 5.4. The presentation emphasizes quantitative improvements (measured and estimated) of the time, quality, or cost of the improvement as well as any DFAM tactics employed.

- 5.5. Practical evaluation: team demonstrates visually (videos, photos, drawings, animation, etc) the task they improved, both before and after.

6. Racetrack Setup

- 6.1. Track will have a starting line and distance markers at 1", 6", 12", and with marks every foot after up to 6 feet. Ruler or measuring tape will be used for final measurement above 12".
- 6.2. Front tire/tires must begin behind the starting line.
- 6.3. A **small** nudge can be used to help get the car moving (see grading rubric)
- 6.4. Each design will have 2 chances to run on the track. The better of the two scores will be used for final judging.
- 6.5. **Final distance of vehicle is measured where the front wheels touch the ground**

