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OFFICIAL RULES AND GUIDELINES – 2023 CHALLENGE

Here's a [printable PDF](#) of the 2023 Official Rules and Guidelines.

This competition is void where prohibited by law. All decisions by M3 Challenge judges are final.

ELIGIBILITY

- High schools in the U.S. (including US territories and DoDEA schools) are eligible. Schools with sixth form students (age 16-19) in England and Wales are eligible.
- A maximum of two (2) teams per school, each consisting of three (3) to five (5) students and one (1) teacher-coach, may register for the M3 Challenge.
- **Teams must be comprised of high school juniors and seniors or sixth form students (ages 16-19) from the same school; no exceptions will be made to allow underclassmen. For M3 purposes, your school is the school name that will appear on your diploma.**
- Dual/joint enrollment programs, magnet programs, and other academic or training programs that draw students from more than one high school for a subset of classes or academic enrichment may be eligible if all of the following criteria are met, and at the discretion of SIAM:
 1. All members of the team meet the grade level and residency requirements.
 2. If prospective student team members attend different schools, one student affiliated with a U.S. high school or U.K. sixth form school must have a teacher register the team as one of their school's teams; and that teacher must be named as the coach of record.
 3. Note that the high school name on the registration will appear on all team member certificates.
 4. No accommodations can be made to register an organization other than a recognized school.
 5. Once registered, a team containing students from multiple schools due to a program affiliation must email m3challenge@siam.org with the team ID number and the program name from which the team is formed. This is for internal record keeping only and will not be reflected in communications or documentation for the team.
- International and exchange students may participate in the Challenge provided they are officially enrolled at an eligible team's school at the time of registration and thorough completion of all aspects of the Challenge.
- Homeschool and cyber school students may either form their own team(s) or request to participate on a team at the school in the district or community in which they reside. All efforts to contact the local school are up to the home or cyber schooled student. However, homeschool and cyber school students may instead elect to form their own team(s), and may do so under these guidelines:

- Homeschool students may form a team made up entirely of other homeschool students. All students must reside in the same state or county and be high school juniors and/or seniors or sixth form students. If grade level is not applicable, the eligible age is 16–18 years old. A signed [Homeschool Affidavit Form](#) is required for each homeschooled student participating in the Challenge.
- Cyber school students may form a team of students from the cyber school at which all team members are enrolled, which means all students must be on track to receive a diploma from the registering cyber school. Students must reside within the U.S., England, or Wales, and must be full-time high school juniors and/or seniors or sixth form level. In cases where grade level is not assigned or applicable, the eligible age is 16–18 years old. Transient students taking classes below a full-time course load are not eligible. A signed [Cyber School Affidavit Form](#) is required for each cyber schooled student participating in the Challenge.
- Online high schools and other hybrid organizations should read the eligibility requirements carefully to see if they are able to participate. Base requirements – the main location or home office, and all student's residency is in the U.S., England, or Wales; maximum two teams per school, 11th and 12th graders only; all team members on track to receive their diploma, with the name of that organization as the student's school.
- Children, grandchildren, and siblings of employees, officers, directors, or trustees of SIAM, and of employees of MathWorks who are on the Challenge staff team, are not eligible to participate in MathWorks Math Modeling Challenge.

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HOW M3 CHALLENGE WORKS

- M3 Challenge poses open-ended and timely problems. Participants should provide insight and suggest solutions via use of the *modeling process*.
- Teachers-coaches must **register** teams by the February 24, 2023 at 4:00 p.m. EST deadline. Teams may login to the M3 website to **make changes** to their registration information up until 3:00 p.m. on the Tuesday immediately following Challenge weekend (Challenge Monday). This allows teams to verify that the team record accurately reflects who participated and allows adjusting for no-shows or last minute substitutions. All team data must be **finalized** by the Friday following Challenge weekend. Certificates of participation will not be re-printed for teams who neglect to keep their team record accurate.
- M3 Challenge will not accept late registrations under any circumstances.
- Choose your continuous 14-hour work time during the Challenge weekend (Friday at 6:00 a.m. EST through Monday at 11:00 p.m. EST) – please convert your local time to EST.
- During Challenge weekend, once any member of your team (coach or student) downloads the problem, your team has exactly 14 continuous hours to submit a solution. The clock cannot be paused. You should start at least 14 hours before the end of Challenge weekend to have use of the full 14 hours allowed.
- The Challenge Problem is unknown to students until teams download it over Challenge weekend to begin their work time.
- **Team members may not discuss any aspect of the problem with, nor seek help from via any means or method, the coach or anyone other than their teammates over Challenge weekend.** Attempts to get help from human sources—in person or via any medium—will result in disqualification, and posting or sharing any part or all of the problem statement anywhere during Challenge weekend (includes assistance through interactive “help” websites or social media).
- **Teams may identify themselves with their team number ONLY.** Other identifying information will exclude the team from possible M3 Finalist status.
- The team login credentials (ID # and password) are SHARED by all members of the team. Safeguard your login credentials, as they allow you full access for the team's contest participation.

- A team may use computers, software packages, books, reference works, internet resources, or any other inanimate sources, all of which must be properly referenced within the solution paper.
- Teams can work from any location they choose.
- **Teacher-coaches are not required by M3 to be present during the Challenge.** If your school policy requires it, teachers may act as proctor only, giving absolutely no help.
- Unethical or disrespectful submissions will be flagged for follow-up.
- All decisions made by the judges are final and are not subject to challenge or appeal. There is no passing score and numerical scores will not be assigned.
- Roughly 37 team prizes will be awarded. See the [prizes page](#) for more details. Once a scholarship form is submitted and payment processed, any further movement of funds is the responsibility of the student winner.
- Use of MATLAB software, or any technical computing software, is not required, and will not influence selection of winners in the Challenge. Use of technical computing software will however put you in contention for a unique technical computing award, separate from other team distinctions. See the [prizes page](#) for more details.
- A team's complete submission will become the sole and confidential property of MathWorks and SIAM. The coach and team members agree to permit MathWorks and SIAM to use any information contained in their entry for any purpose deemed relevant. Teams may also share their submissions with their local school and community.
- It is the sole responsibility of the individual schools to (a) provide any specialized staff or assistance for team members with special needs to participate as required by law and (b) provide and be responsible for any transportation of the team members to Challenge events. Neither SIAM nor MathWorks is responsible for any risk, injury, or damage related in any way to any student's or team's participation in the Challenge.
- By registering, you agree to receive the important emails from the Challenge via email and/or MailChimp, the email communication service used by the Challenge, sent directly by SIAM. Please whitelist M3challenge@siam.org and m3mailer@siam.org in order to receive these emails.
- M3 Finalist teams and the Technical Computing Prize Awardees will be invited to present their papers for the final confirmation phase of judging (see "[Important Dates](#)"). Presentations by the entire team are a requirement for winning one of the prizes. Barring unforeseen events, the location of the final event is New York, NY, and travel and expense funds will be available for teams. Teams that are unable to present their papers, or are unable to have all members present for the final event, are not eligible for these prizes. Exceptions may be made for medically-documented reasons at the discretion of the organizers. Travel documents (ex: passports, visas, any necessary documentation to get to the final event) are the responsibility of individual team members and coaches. If you need a passport or other travel documents to get to New York City in the U.S., it is your responsibility to make sure you have them on time. See all [scholarship prizes](#) available.
- **M3 Finalist Awards** honor the top six teams overall for outstanding mathematical approaches to the three main prompts in the Challenge problem. Teams should create mathematical models; justifying assumptions, defining parameters, describing their process, analyzing effects of change, and describing results. **Scholarships Amounts:** Champion - \$20,000; Runner Up - \$15,000; Third Place - \$10,000; Finalist (3) - \$5,000 each. Winners in the UK receive current conversion amounts in pounds.
- **M3 Challenge Technical Computing Award** honors teams for an outstanding use of computer programming in their solution for the Challenge problem. To be eligible for the award, teams must use a programming platform other than spreadsheets. Writing code is not required to participate in or to win M3 Challenge. *This award may be overlaid and added onto other prizes; it is not mutually exclusive. **Scholarship Amounts:** Winner - \$3,000; Runner Up - \$2,000; Third Place - \$1,000. Winners in the UK receive current conversion amounts in pounds.

- **Important disclaimer for teams from M3 Challenge HQ**

MathWorks Math Modeling Challenge, SIAM, and MathWorks are not responsible for local weather conditions, power or Internet outages, pandemic or disease spread and related common sense actions, or any other situation or circumstance that would prevent a potential team from registering, or from fully participating in the Challenge, (including, for example, by preventing the submission of a paper during their selected Challenge work time) or that prevents normal M3 Challenge processes or procedures from occurring (including for example, cancelation or replacement of the final event). No accommodations can be made for teams if such unfortunate circumstances were to occur during registration or at any time during the Challenge, up through and including final event.

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PREPARATION OF YOUR SOLUTION PAPER SUBMISSION

- **FORMAT**

- Solution papers must be typed and in English.
- Papers must be submitted as a PDF file, no longer than 20 single-sided pages in length. **Judges request a minimum font size (12) and minimum 1" margins (all around).**
- Submitting code for the Technical Computing Prize consideration? Include your code as an appendix, those pages **DO NOT** count toward your 20 page limit.
- Each page of the solution paper must contain the team's ID # and page number in the header at the top of the page. For example: Team # 12345, page 1 of 15.
- M3 Challenge organizers will convert any non-PDF submission to PDF; but we cannot guarantee the file integrity after this process. Teams should create and review their PDF before submitting.
- A solution paper must be contained in a **single file** upload. Charts, tables, and other graphics must be embedded into the PDF document.
- Multiple files contained in a ZIP file or other compressed file format will not be accepted. No supplemental files should be uploaded with your solution paper. Cloud-based document links are not accepted.
- Displaying math? View the *Math Modeling: Getting Started and Getting Solutions* (p. 42-44) for technical writing dos and don'ts, and the *Math Modeling: Computing and Communicating* (Chapter 3: Visualization). Access both handbooks free on the [modeling handbooks](#) page.
- A [solution paper template](#) has been provided for teams wishing to use it.

- **CONTENT**

- Organization, conciseness, and clarity of the solution paper are critical.
- Provide only your team ID #. Do NOT include any identifying information in your solution paper.
- A solution paper should answer all questions posed and have the following elements:

SUMMARY of results must be at the first page of your solution paper, clearly identified and not more than one page in length. It should be a concise, straightforward explanation of the main results and answer the questions posed, written with minimal use of technical language. Judges will not read past a poorly written summary.

The body of your paper should include:

RESTATEMENT of the problem, and JUSTIFICATION of all assumptions.

ANALYSIS of the problem, DESIGN of the model, and JUSTIFICATION of the modeling used.

DISCUSSION of how the model can be tested for accuracy, stability, and sensitivity to assumptions.

APPENDIX for code (OPTIONAL) - if your team chooses to submit technical computing work.

- **CITATIONS**

- **Give credit where credit is due:** Make sure you provide attribution when you are using ideas that are not your own. A list of all references used should be placed at the end of the paper; any consistent citation style is allowed. When a quote, figure, equation, statistic, paraphrased idea, insight, or any other information from a source is used in the solution paper, it should be marked with an in-text citation (e.g. a reference number [17], author + year [Simmon 2011]).

- **CODE**

- If you write code as part of your solution (writing code is not required), you should explain the methodology in your paper. To be eligible for the Technical Computing Scholarship Award, via coding other than spreadsheets, you must include your code as an appendix. **Those pages will not count towards your 20 page limit. See [scoring guide](#) for more information on what judges value for this award.**

- **SUBMISSION OF RECORD**

- You may upload versions of your solution paper at any time from the start of your Challenge time until your deadline. **If you upload more than once, your most recent upload will entirely replace any previous versions and will become your submission of record** – the last upload before your time expires is the submission on which you will be judged.
- No supplemental materials will be accepted once you have submitted your final solution paper.
- If your upload attempts are problematic, as a last resort you may email your submission – within or immediately following your 14 hour work time – as an attached PDF file to m3challenge@siam.org with your team # in the subject line.

- **PARTIAL SOLUTIONS ARE ACCEPTABLE**

- Creativity, good work, and acknowledging where you fall short and what you would have done with more time is valued. The judges are particularly interested in each team's approach and methods. Judges will read, score and often provide feedback and comments on partial solutions. Even if you feel you did not complete or get far enough, submit it.

- **AUTHENTICITY**

- By uploading a solution paper during Challenge weekend, you are guaranteeing that the work is completely your own. All suspected instances of plagiarism will be taken seriously and investigated. Plagiarism will result in disqualification.

- **JUDGING/ASSESSMENT**

- A sample [scoring guide](#) is provided for further direction as to how your paper will be judged.

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ROLE OF TEACHER-COACH

- Teacher-coaches may be part-time or full-time teachers or administrators employed by the team's school or by the district in which the school is located. Exceptions may be made, such as a retired teacher or administrator who is still affiliated with the team's school may serve as coach.
- One teacher may coach both teams or each team may choose to have different teacher-coaches from the same school.

- The teacher-coach is responsible for:
 - Registering the team correctly and for ensuring that all parts of the registration process are accurate and complete.
 - If possible, teacher-coaches should help prepare the teams for the Challenge or point teams to the free resources like the [math modeling handbooks](#), the [GAIMME report](#), math modeling [video series](#), and the [archives](#).
 - Also check out “[Tips and Guidance](#)” for great suggestions for a successful Challenge weekend.
 - During the week following the Challenge, the teacher-coach will be notified via email that the authenticity form is available at the "Authenticate" page behind the [login page](#). This certification requires that the teacher-coach have a conversation with the team (or the team captain who speaks for the team) following their final submission and is able to ascertain to the best of their knowledge that the team did not violate any of the rules of the Challenge.
- Take note of and safeguard your team ID # and shared password. It is possible to recover the password at the [login page](#).
- Teacher-coaches are **not** required to be physically with or near the team during Challenge weekend.

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CONSENTS AND CERTIFICATIONS

• UNDERSTANDING RULES AND GUIDELINES

As part of the team registration, teacher-coaches must acknowledge that they and their student team members have read and understand the rules. This certification is built into the registration process.

• AUTHENTICITY CERTIFICATION

The teacher-coach for each team will be prompted via email immediately after Challenge weekend to electronically certify authenticity after the team submits its final solution paper.

• PARENTAL/GUARDIAN CONSENT

Each student team member’s parent or guardian must login with the team credentials and electronically sign their consent. Students age 18 and over may sign their own consent. All consents must be completed by Challenge weekend.

• WINNING TEAMS

For teams distinguished with Honorable Mention, Semi-Finalist, Finalist, or Technical Computing Awardee status, each winning team member must fill out an online Scholarship Payment Form. The date we receive the form will influence when your scholarship check will be processed and mailed. Student winners may have their scholarship payment held in escrow until they are ready to use it. Once a scholarship form is submitted and payment processed, any further movement of funds is the responsibility of the student winner. Any scholarship or portion of a scholarship awarded but remaining unused or unclaimed on the sixth (6th) anniversary of the date of email award notification will be deemed abandoned, the right of the associated scholarship prize winner will expire, and the funds will revert to SIAM. See the [Scholarships and Recognition](#) page for more information about prizes.

The M3 Finalist and Technical Computing Awardee teams invited to New York, NY for the final event receive funds to pay for travel and related expenses. For more information, see the [M3 Challenge Team Travel and Expense Reimbursements Guidelines](#).

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