THE CHALLENGE   **PARTICIPATE**   **RESOURCES**   **ARCHIVES**

RULES AND GUIDELINES; ELIGIBILITY

CHALLENGE CHECKLIST

IMPORTANT DATES

REGISTER NOW

OFFICIAL RULES AND GUIDELINES – 2021 CHALLENGE

Here's a printable PDF of the Official Rules and Guidelines

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;** absolutely 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 are eligible if the school or program is integrated or affiliated with an accredited high school. NCSSSMST member high schools are permitted to form teams.

- 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 through 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 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

- Use of MATLAB software, or any technical computing software, is not required, and will in no way influence judging or 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.

- Teams must register by the February 19, 2021 at 4:00 p.m. **EST** deadline. The teacher-coach registers the school information and inputs team members' information. 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. If you miss this deadline, changes may be sent via email. All team data must be finalized by the Friday following Challenge weekend. Certificate accuracy is not guaranteed if the deadline is missed. Certificates 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.

- To guard against the possibility of interruptions in Internet service, school closings due to weather or any other extraneous situation, we recommend that teams complete the registration process well in advance of the deadline.

- Roughly 37 team prizes will be awarded. See the prizes page for more details.

- Choose your continuous 14-hour work time during the Challenge weekend: that is Friday at 6:00 a.m. EST through Monday at 11:00 p.m. EST – please make sure you convert your local time to EST when planning your work time.

- The Challenge Problem is unknown to students until teams download it over Challenge weekend to begin their work time.

- 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 download the problem with at least 14 hours before the firm end of Challenge weekend in order to have use of the full 14 hours allowed.

- **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.** Any attempts to get help from human sources–in person or via any medium–will result in disqualification. This includes attempts to seek assistance through interactive "help" websites or social media. The Internet is continually monitored during Challenge weekend and violators will be disqualified. Seeking assistance outside of the team grossly violates the spirit of the Challenge. Posting or sharing any part or all of the problem statement anywhere during Challenge weekend is strictly prohibited and results in disqualification and sanction.

- **Teams may identify themselves with their team number ONLY**. Having any other identifying information included on a submission 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 to make changes to your team record, affirm parents' consents, download the problem during Challenge weekend, upload your solution paper during your work time, and check the status of your paper after you submit.

- 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, with absolutely no help.

- Teams should act with integrity. Unethical or disrespectful submissions will be flagged for follow-up. Coaches must impress upon all team members the need for honesty and integrity. In addition to disqualification, a letter of admonition will be sent to the principal and the coach of any school whose students submit an unethical or disrespectful solution.

- 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.

- 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 publicity or educational purposes in any media, or 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.

- The six 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 <u>entire</u> teams are a requirement for winning one of the prizes. 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, but are 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 oustanding 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.

- **M3 Technical Computing Scholarship Award** honors teams for outstanding use of programming to analyze, design and conceive a solution for the Challenge problem. Team must use any programming platform other than spreadsheet, such as MS Excel, to be eligible for the award. *This award may be overlaid and added onto M3 finalist, semi-finalist or honorable mention distinction and prizes; it is not mutually exclusive. **Scholarships** **Amounts:** Winner – $3,000: Runner Up – $2,000: Third Place – $1,000

- **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 their PDF and do final review 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). View both handbooks 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 your school name, any student names, or any other 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 – if your team chooses to submit techinical computing work.

- **CITATIONS**

    - A list of all references used should be placed at the end of the paper in a bibliography or references page. No particular citation style is required.

    - Moreover, 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], etc.). This citation should indicate exactly what bibliography entry is being used, and it should be accompanied by a clear explanation or summarization of what information was used from the cited source.

- **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. T**hose 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 your 14 hour work time, and as an attached PDF file.
  - If your work time expires while you are trying to upload your solution, email it to m3challenge@siam.org with your team # in the subject line IMMEDIATELY.

- **PARTIAL SOLUTIONS ARE ACCEPTABLE**

  - Creativity, good work, and acknowledging where you fall short and what you would have done with more time could get you recognized. The judges are particularly interested in each team's approach and methods. Judges will read, score and (most 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. The M3 Challenge uses CrossCheck to vet submissions for possible plagiarism.

- **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.

- In the case of two teams from one school, the same 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 using resources like the math modeling handbooks, the GAIMME report, math modeling video series, and from the archives, previous problems, winning solutions, and insights from judge's perspectives – all freely available on the M3 Challenge site.

  - Also check out "Tips and Guidance", and other Resources on this site for great suggestions for a successful Challenge weekend.

  - The teacher-coach is responsible for submitting the Authenticity Certification during the week following the Challenge. The teacher-coach will be notified via email that the form is available at the "Authenticate" page behind the login page. This certification means only that the teacher-coach has had 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 worked with integrity, did not violate any of the rules of the Challenge, and that the submission is legitimate.

- Teacher coaches and team members should take note of and safeguard their 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. If you do not plan to be with or near your students during Challenge weekend, please be sure they have their team ID # and password readily available so they are able to login, download the problem, and upload their solution paper.

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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. Certification is due at M3 Challenge headquarters on or before 8:00 p.m. EST on the Friday following Challenge weekend.

- ## 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. M3 Challenge organizers are especially interested in students reporting their ethnicity on this consent form in order to track and improve our diversity and inclusiveness.

- ## 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 so that payment of their scholarship prize can be processed. Student winners may have their scholarship payment held in escrow until they are ready to use it. The link to the Scholarship Payment Form will be made available to prize winners at the time of recognition; and the date we receive the form will influence when your scholarship check will be processed and mailed. 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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