UWI MATH FAIR 2024: *MATH MODELLING CONTEST*

Guidelines for Submissions.

❖ The Math Modelling Contest consists of **TWO** categories**:**

- **Category I: Math Modelling question** (up to 5 participants per group from any form in the same level)

- **Category II: Poster** (up to 3 participants per group from any form of the same level)

❖ For both categories (Math Modelling question, Poster), there are two levels:

- o Junior: Form 1 – 3 (Secondary school)

- o Intermediate: Form 4 – 5 (Secondary School)

- o Senior: Form 6 (Secondary school)

To create your mathematical model, choose any one of the following topics:

- ▪ **Topic 1:** Junior: Form 1 – 3 (Secondary School)

  1. How can we strategically position three ambulances to maximize the number of residents reached within an 8-minute window? Is it feasible to ensure complete coverage, and if not, what is the extent of the population left uncovered?

  2. With just two ambulances available, due to one being reserved for emergency calls, what is the optimal placement to ensure the highest coverage within an 8-minute response time? Is full coverage possible, and if not, what's the population gap?

- ▪ **Topic 2:** Intermediate: Form 4 – 5 (Secondary School)

  1. How can we strategically position three ambulances to maximize the number of residents reached within an 8-minute window? Is it feasible to ensure complete coverage, and if not, what is the extent of the population left uncovered?

  2. With just two ambulances available, due to one being reserved for emergency calls, what's the optimal placement to ensure the highest coverage within an 8-minute response time? Is full coverage possible, and if not, what's the population gap?

3. With two ambulances unavailable, where is the best location for the remaining ambulance? Is comprehensive coverage attainable, and if not, how many people will remain without coverage?

4. In the event of a catastrophic incident involving residents from multiple zones, can the Ambulances effectively respond? What strategies can cities or counties employ to prepare for rare yet catastrophic events?

- **Topic 3:** Senior: Form 6 (Secondary School)

1. How can we strategically position three ambulances to maximize the number of residents reached within an 8-minute window? Is it feasible to ensure complete coverage, and if not, what is the extent of the population left uncovered?

2. With just two ambulances available due to one being reserved for emergency calls, what's the optimal placement to ensure the highest coverage within an 8-minute response time? Is full coverage possible, and if not, what's the population gap?

3. With two ambulances unavailable, where is the best location for the remaining ambulance? Is comprehensive coverage attainable, and if not, how many people will remain without coverage?

4. In the event of a catastrophic incident involving residents from multiple zones, can the Ambulances effectively respond? What strategies can cities or counties employ to prepare for rare yet catastrophic events?

5. In addition to the contest's format, create a concise 1-2 page non-technical memo outlining recommendations based on your model and analysis findings for the Ministry of Health.

To create your poster, choose any one of the following topics:

- **Topic 1:** Ratios/Math in Nature

- **Topic 2:** Math of Our Ancestors

- **Topic 3:** Math in Caribbean Architecture and Engineering

❖ Submissions will be accepted from **Wednesday 8ᵗʰ November , 2023 at 11:59 p.m**. to **Friday 15ᵗʰ January , 2024 at 11:59 p.m.** via a Google Form available on the UWI Math Fair website. There is **no** registration fee.

❖ Selected participants may be asked to make a short oral presentation on their poster/model at the UWI Math Fair 2023 on Thursday 1ˢᵗ February , 2024.

❖ Please note that all entries must be submitted via the link provided on the website before the deadline. Unsuitable submissions will be denied entry into the contest. Plagiarism will not be tolerated. Submissions made for previous Math Fair events will not be accepted.

❖ The Judges' decisions on any matter are final. There is no obligation on the part of The Department of Mathematics and Statistics, or on the judges to provide an explanation for any decision made.

❖ Participants are allowed to enter **both** sections (Math Modeling question, poster) by submitting separate entries via the submission link available on the website.

❖ Prizes/medals for the top 3 individual performances in each level of both categories will be awarded.

❖ An electronic Certificate of Participation will also be prepared for each participant and sent via email.

❖ Visit **www.uwimathfair.com** for more information.

❖ Any enquiries about the contest and the rules should be addressed to:
 Email: STA-UWIMathFair@sta.uwi.edu

❖ Please refer to the following table for the requirements for entries in each section:

Category I: Mathematical Model Entries	Category II: Poster Entries
This entry is a submission of a Mathematical Model / concept and must include the following: • Title of Submission. • School name, nation, group member names (including advising teacher if any) and level. • Project must reflect the selected topic. • Your presentation should address how the chosen mathematical concept can be used in modelling real- world phenomena. • In your discussion, you should clearly illustrate how Mathematics was used to interpret, analyze or predict in the chosen application. • A Conclusion must be included. • Participants are required to construct a functioning model based on the chosen topic. • Participants are required to submit a 3–5-minute video explaining the mathematical concept at work, documenting the creation of the model, demonstrating the operation of the model and providing application of the model. The video should also provide appropriate angles and close-ups of the piece. • Participants are required to submit a PDF of their finished model. • The videos (in MP4 format) and photo must be submitted via the link provided on the website (**www.uwimathfair.com**).	Submissions accepted in either portrait or landscape orientation and must include the following: • Title of Submission. • School name, nation, group member names (including teacher if any) and level. • Project must reflect the selected topic. • Your poster presentation should address how the chosen mathematical concept can be used in modelling real-world phenomena. • In your discussion, you should clearly illustrate how Mathematics was used to interpret, analyze or predict in the chosen application. • A Conclusion must be included. Pictures of physical posters (made by hand) can be submitted. Digital posters can be created using **any** suitable online software tool (For example: Microsoft Word, Microsoft PowerPoint, Microsoft Publisher, Canva, Adobe Illustrator). Submissions should be converted to a PDF document before submitting via the link provided on the website (**www.uwimathfair.com**).

❖ The marking rubrics for both sections have also been included as illustrated below.

UWI MATH FAIR MATH MODELLING CONTEST - MARKING RUBRIC

Name(s):_____ Level: <u>Junior / Intermediate/ Senior</u>

School(s):_____

Country: Total Score:_____/ 20

<u>Judging Criteria- Category I: Mathematical Model</u>

Criteria	Description	Excellent (4 points)	Good (3 points)	Satisfactory (2 points)	Minimal (1 point)
Mathematical Competence	The presenters Showcased a commendable proficiency in employing relevant mathematical concepts to the designated topic and theme.				
Mathematical Model / Engineering goals	The mathematical concept was illustrated flawlessly and enhanced audience understanding of the model.				
Relevance of the Model	The project has real-life applications which were explained.				
Visual Presentation	The model showed a highlevel of creativity, visual appeal and originality.				
Oral Presentation	Presenter(s) explained the ideas and information clearly, concisely and used mathematical jargon appropriately.				

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Name(s):_____ Level: <u>Junior / Intermediate/ Senior</u>

School(s):

Country: _____ Total Score:_____ / 20

<u>Judging Criteria- Category II: Poster</u>

Criteria	Description	Excellent (4 points)	Good (3 points)	Satisfactory (2 points)	Minimal (1 point)
Relevance of the Project to Topic	The content is directly linked to the chosen topic.				
Mathematical Competence	The presenters demonstrated competence in applying their chosen mathematical concept to the application.				
Applications of the Model	The project has real-life applications which were explained.				
Conciseness and Flow	The material is presented in a concise and logical manner , ensuring a seamless progression of content.				
Visual Presentation	Project showed a high level of creativity and visual appeal.				