Tournament Handbook

TOURNAMENT OVERVIEW

Welcome to this Year's Math and Science Fair! Tanzania's largest platform for engagement in Science, Technology, Engineering and Mathematics. Here, we use what we have learnt in the classroom to solve problems, innovate and change the world in the most exhilarating, fun and exciting way. Join us as we revolutionize the African Innovation Space.

Introduction & Objectives

The Math & Science Fair Tournament is designed to:
- Break the myth that Mathematics and Science are abstract and disconnected from daily life.
- Stimulate interest in Mathematics, Science, and Coding through interactive competitions.
- Encourage students to apply principles in solving real-world problems.
- Build teamwork, critical thinking, and communication skills among participants. - Attract more students into science, technology, engineering, and mathematics (STEM) pathways.

The Competition

The Math and Science fair shall have four main categories;

- Math Collaborative Contest
- Science Problem Solving Contest
- Quiz Category
- Coding Category

Teams must remain the same throughout the tournament, except in cases of medical emergencies. Tournament shall be divided into **junior teams** (form 1-3, grade 7-9) and **Senior teams** (form 4 -6, grade 10-12) should the number of teams warrant the division. Additionally, All Categories shall be run simultaneously, therefore it is important for students to select one category that suits their interest.

Schedule & Day Structure

TIME (HRS)	ACTIVITY
0700-0800	Breakfast, Arrival & Registration
0800-0900	Opening Ceremony
0900-0930	Round 1
0930-0945	Briefing for Round 2
0945-1015	Round 2
1015-1030	Briefing for Round 3
1030-1100	Round 3
1100-1130	Break
1130-1300	Announcement of Breaks & Semi-Finals
1300-1400	Lunch
1400-1500	Finals
1500-1700	Awards & Closing Ceremony
1700	End

General Rules

- All teams must be punctual for their rounds.
- Calculators are not allowed, unless specified in a category.
- No electronic devices except those permitted.
- Appeals must be written and submitted after a session.
- Judges' decisions are final.

2. **CATEGORIES**

A. Quiz

Introduction

The Quiz category tests students' ability to recall and apply knowledge quickly across Physics, Chemistry, Biology, Mathematics, and General Science.

Rules

- Each team consists of 3 members.
- Questions are short-answer or one-word response.
- No calculators allowed.
- Each correct individual answer: 10 points.
- Correct answers after team conferencing: 5 points.
- Time per question: 30 seconds (non-calculation), 60 seconds (calculation).

Format

- Round 1: General Science

The Team shall be asked questions from various science subjects such as Physics, Chemistry, Biology and Astronomy

- Round 2: Mathematics

Students shall be given a mix of short answer and written calculation mathematics.

- Round 3: General Knowledge

Students shall be tested on their general knowledge understanding of the world around them with perspective to math and science.

- Semifinals: Lightning Round

For the lightning round, students with the quickest answers (by raise of hand) shall be the ones to answer the questions correctly.

- Finals: Knockout Quiz

The finals shall be a knockout quiz where students with the highest points shall be declared the quiz champions.

B. Science Problem Solving Contest

Introduction

This category emphasizes analytical and logical problem-solving through interdisciplinary science challenges.

Rules

- Teams of 3 solve structured science problems.
- Each round has time limits (30–90 minutes).
- Answers must be supported with reasoning.

Format

- Round 1: Relay Questions

In this phase, teams of students compete like runners in a 4–by–100m track relay. Team members each complete one portion of a problem, then hand off their answers to fellow teammates who then try to complete the next "lap" of the race. Students are arranged into teams of four, aligned in a row. A relay question consists of four parts: the first student completes part 1 and hands it to the second person, who uses that answer to solve part 2. This answer should then be passed to the third person, who uses it to solve part 3, etc. The fourth person, on completing the question, hands it to the marker.

- Round 2: Team Phase

This phase is a Collaborative event in which team members work within a given time to produce a single solution or set of solutions. Thorough justifications are required for full credit. The team is provided with a set of 3-5 questions which must be solved as a team

- Round 3: The Code Breaker

Students in their teams shall be given a total of 4 questions, through which they are to solve and get answers. The answers to each of the four questions are single digit numbers which correspond to a lock. Once the lock is opened, participants shall solve one final question within the unlocked bag. Teams that complete this process within the shortest time possible are awarded higher points.

- Semifinals: Science Puzzles

Students shall be given a crosswords that they must solve within the shortest time possible. Teams with the most correct answers filled within the shortest time possible shall be the winners.

- Finals: Present & Defend

Teams are provided with real world challenges through which teams are to create solutions during preparation time that will be allocated to them. Once the preparation time elapse, they shall require to present their ideas to a panel of judges for allocation of marks.

C. Mathematics Collaborative Contest

Introduction

This contest tests students' collaborative and logical mathematical problem-solving abilities through teamwork-based challenges.

Rules

- Teams of 3 students work collaboratively.
- Calculators are not permitted.
- Full working must be shown for marks.

Round 1: Team Phase

Marks: 45 Time: 1hr 30 Minutes

This phase is a Collaborative event in which team members work within a given time to produce a single solution or set of solutions. Thorough justifications are required for full credit. The team is provided with a set of 3-5 questions which must be solved as a team

Round 2-Relay Phase:

Marks: 45 Time: 1hr 30 Minutes

In this phase, teams of students compete like runners in a 4–by–100m track relay. Team members each complete one portion of a problem, then hand off their answers to fellow teammates who then try to complete the next "lap" of the race.
Students are arranged into teams of four, aligned in a row. A relay question consists of four parts: the first student completes part 1 and hands it to the second person, who uses that answer to solve part 2. This answer should then be passed to the third person, who uses it to solve part 3, etc. The fourth person, on completing the question, hands it to the marker.

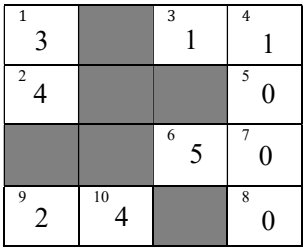
Round 3 – Quick Fire Mental Math

Marks: 45 Time: 30 mins

Teams are engaged with questions without the use of a calculator nor writing material. They are asked questions with the expectation for the fastest to raise their hand and answer orally to get marks. Questions are comprised of simple arithmetic, number patterns and quick algebra

Semi-Finals – Math Puzzles

Marks: 36 Time: 1hr
Teams solve an across clues and down clues involve sums/multiplications of digits.
Example:



Across
3- Square root of 121
6- A Quarter of 200
9- 4 Factorial (4!)

Down
1-4% of 340
4- 100 *10

<u>Final- Sprint Phase:</u>

Marks: 10Time: 30 Minutes

Each team is seated in a predetermined spot, and each member of the team has to do ten multiple choice questions in 10 minutes. The team members are labeled P, Q, R and S. The questions are also divided into groups of four (P, Q, R and S.).
At the starting signal, each team member has to sprint to an assigned problem station to pick a copy of the first problem. As soon as a team member has an answer for the problem, they have to sprint to the problem station to pick up the next problem. Participants should not solve the problem while standing next to the judge or on the way; instead they should reach their chair and solve their problems seated.

Example:

1. The surface area of a cube is 450 cm2.Find the length of an interior diagonal of the cube.
(A) 5√3cm (B) 15cm (C) 5√6cm (D) 8cm (E) 10cm

2. The houses in a street are spaced so that each house is directly opposite another house. The houses are numbered 1,2, 3,... and so on up one side, continuing in order back down the other side. Number 36 is opposite number 65.
How many houses are there?
A) 98 B) 100 C) 102 D) 104 E) 106

D. Coding

Introduction

The challenge allows young innovators to showcase their programming skills in Python and HTML/CSS through a series of rounds that gradually increase in complexity.

NB: Students must bring their own laptops for the coding masters challenge.

Day 1-Preliminary Rounds

Round	**Name**	**Description**
Round 1	Syntax Start-Up	Solve basic Python and HTML syntax challenges
Round 2	Spot the Bug	Debug broken Python code & identify logic errors
Round 3	Fix & Run	Rearrange and correct scrambled code snippets

Round	Name	Challenge
Semi-Finals	Mini Builders	Build a simple utility using either Python or HTML/CSS
Grand Finale	Innovators' Showdown	Develop and pitch a functional, innovative prototype aligned with SDGs

Structure

- Individual Students participating
- No AI tools or code generators allowed
- Internet access allowed for reference and access to coding websites only

Sample Questions

Round 1: Syntax Start-Up Python:

1. Write a Python program to greet the user.
2. What will this print? print(4 * (2 + 3))
3. Correct this code:
4. Write a Python program to calculate the square of a number.

```python
age = input("Enter age)
print("You are " + age + " years old")
```

HTML:

1. Write the HTML boilerplate structure.
2. Add a title and a paragraph to an HTML page.
3. Insert an image using HTML.
4. What's the difference between <ul> and ?

Round 2: Spot the Bug

Fix the following Python code snippets and identify errors:

```python
for i in range(10)
print(i)
```

```python
name = input("What is your name"
print("Hello " + name)
```

Round 3: Fix & Run

Rearrange this scrambled Python code:

```python
print("Temperature in Fahrenheit is: ", fahrenheit)
fahrenheit = (temperature * 9/5) + 32
temperature = float(input("Enter temperature in Celsius:"))
```

Semi-Finals:

- Python: Student grading system or class timetable.
- HTML/CSS: School event landing page or club homepage.

Grand Finale:

Build and pitch a mini-solution on:

- Youth Empowerment: App that lists digital skills courses
- Climate Action: Tracker for environmental actions
- Smart Education: Homework planner or quiz game