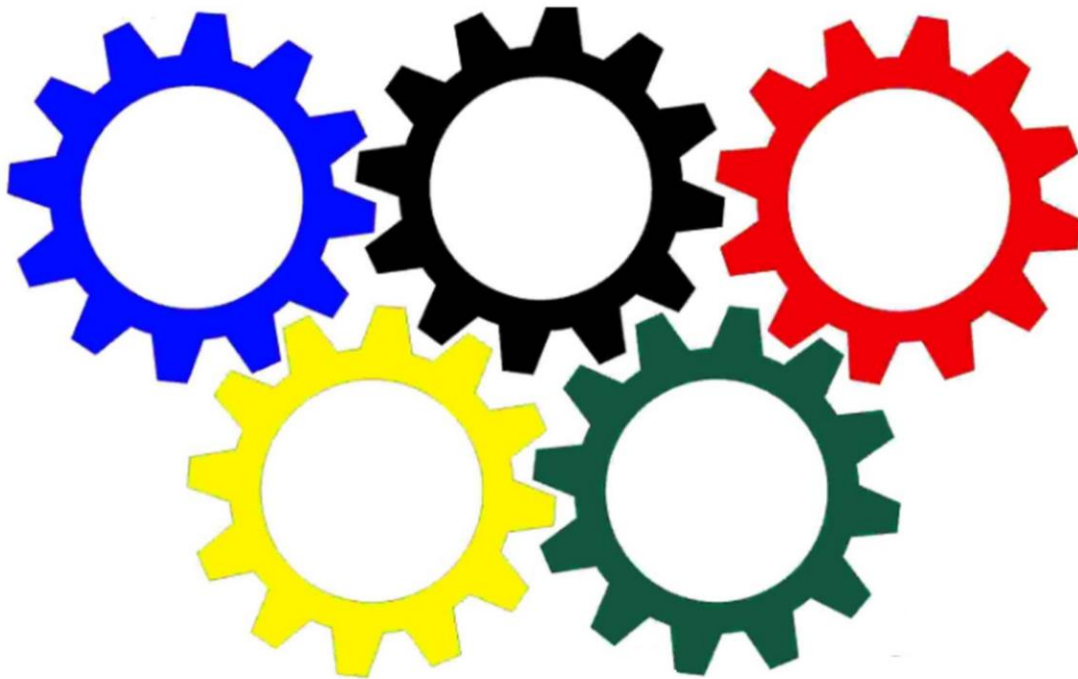# RoboRio 2016

THE OFFICIAL INTERNATIONAL E-LYMPICS
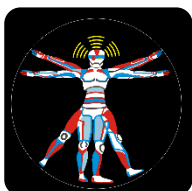
July 2016-August 2016

Just Cause Education Outreach

www.justcausecanada.org
Ontario, Canada

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TEAM 4525 RENAISSANCE ROBOTICS
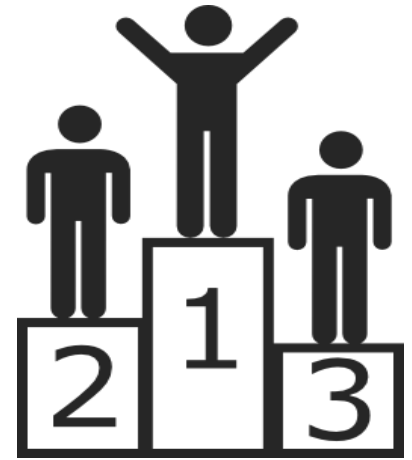
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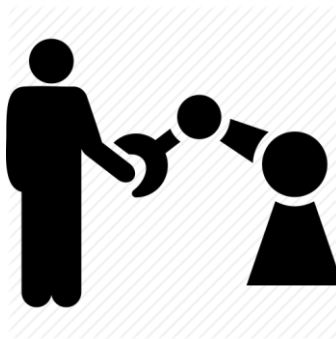4525FRC@gmail.com

Contact us @4525FRC

Overview

Goals

To take part in a co-opertition through *STEAM powered STEM* in the theme & spirit of the Olympic Games.

1. **Science** - design and set up each event so it is a "fair test" for valid comparison in all
   Locations. (consistent, predictable, reproducible)
   -Collect and recording data, analysing and interpreting data
   -documenting observations via video

2. **Technology** - write code, developing autonomous programs
   -design and build mechanisms to complete assigned tasks
   -set up and record a live webcast

3. **Engineering** - design, build and program robots that will complete assigned tasks

4. **Arts** - design a team logo and/or mascot and make a piece of team swag!
   -create and edit a sports broadcast video
   -visualize & plan structures and spaces in 2D and physically make them in 3D

5. **Math** - Measuring and timing,
   - generating statistics, graphing data sets, comparing
   -extrapolating and scaling data

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4525FRC@gmail.com

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E-lympic Event Descriptions

100m Sprint

The 100 metres is a sprint race in track and field competitions. The shortest common outdoor running distance, it is one of the most popular and prestigious events in the sport of athletics. It has been contested at the Summer Olympics since 1896 for men and since 1928 for women. The 100m men's Olympic sprint champion is hailed the fastest man on earth, and the world stops to watch it.

During the RoboRio human competitors will run 100m, Lego NXT/EV3 robots will run 4m and OZOBOT will run 2m and HexBugs will run 1m (need to premake a track) All times will be recorded on the shared Google Sheet.

Students will also research both the fastest Canadian Olympian, fastest Ugandan Olympian and the Olympic 100m World Record Holder and enter their times on the shared Google Sheet.

Shot Put

The shot put is a track and field event involving "throwing"/"putting" (throwing in a pushing motion) a heavy spherical object —the shot—as far as possible. The shot put competition for men has been a part of the modern Olympics since their revival in 1896, and women's competition began in 1948.

During the RoboRio human competitors from Canada and Uganda will throw a shot and record their distance on the shared Google Sheet.

The robot competitor Rambot 4.0 will shoot a ball and this distance will be recorded on the shared Google Sheet. The Lego EV3 robot will be built with the ball shooter mechanism angled upward. The distance it can shoot a ball will be recorded on the shared Google Sheet.

Shot distances will be measured from the start line to where the ball strikes the ground. Lego Robots will use a multiplier of 4x their distance in order to scale their throws proportional to human players.

Football

Gooooal! Football became an Olympic sport at the Paris 1900 Games, with women joining in at Atlanta in 1996. In Rio, 16 countries will battle for the men's title and 12 for the women's gold medals. Matches are played in seven stadiums across the country.

During the RoboRio the Lego NXT will be loaded with 4 balls and its objective is to hit each of the 4 targets, using one autonomous program. The targets will be 20 cm apart (5 cm x 5 cm) and the robot must start 50 cm back from the target. The percentage of goals scored (targets hit) will be recorded on the shared Google Sheet.

The human competitors will have 5 soccer balls and they need to hit each of the 4 targets corners. The percentage of goals scored (targets hit) will be recorded on the shared Google Sheet.

Students will also research both the penalty kick goal percentages for the Uganda National Men's & Women's Football Team (The Cranes) and the Canadian Men's & Women's National Soccer team. They will record these percentages in the shared Google Sheet.

Rhythmic Gymnastics

A spectacular show in which gymnasts use apparatus, a ring, a ball and a ribbon, to wow the judges. This graceful women-only discipline made its Olympic debut more than 30 years ago, at the Los Angeles 1984 Games. Accompanied by music, athletes perform in individual or team events.
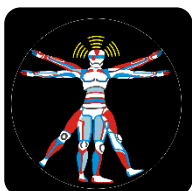
During the RoboRio students in both Canada and Uganda will use OZOBOT to compete. Students in Uganda will choose a 30 sec part of a piece of music for the students in Canada to choreograph a rhythmic gymnastics routine for OZOBOT. The Canadian students will choose the music for the Ugandan OZOBOT routine. The routine will be scored according to the following list of required elements worth 50% of the score plus a subjective score (out of 10) worth 50% based on creativity, performance and how well the routine complemented the chosen music.

Required Elements:
- ❏ Multiple (more than 2) spins (2 marks)
- ❏ Pause (2 marks)
- ❏ Incorporate a coloured ball into the routine - contact must be made (2 marks)
- ❏ Changing "ribbon" (light) colour (2 marks)
- ❏ "Figure 8" movement (ring) (2 marks)

The scores (as a percentage) will be recorded in the shared Google Sheet.

Scoring, Judging and Awards

Awards for the 2016 RoboRio E-lympics will be presented to students participants as follows. The builder/programmers of a winning robot will need to accept the medal on behalf of their bot. Awards will take place after all events are completed.

Additional surprise awards for special merits and achievements may also be presented!

I. Event Completion Awards

Each event will have awards for successful completion. Students who successfully meet all criteria for an event either with a robot or as a human competitor will receive an award ribbon!

Event Winner Medals

Using the Google spreadsheet of results for each event, a first, second and third place medal winner will be presented for each of the four events.

Team E-lympic Trophy

A team that successfully fields a human and a robotic entrant in each of the four events will be presented with a team championship trophy!