

# World Robot Olympiad 2020

Surprise Category  
Elementary – Junior - Senior

## SUGAR SHACK

Version: November 12, 2020



*Gold Partner*

**RioTinto**

*WRO International Premium Partners*



# 1. Introduction

Welcome to the sugar shack, where we make the famous Canadian maple syrup!

Your Surprise mission is to bring buckets of maple sap to the table of the sugar shack. And while you are in the snow, make some snowballs and throw them for fun!



## 2. Robot characteristics

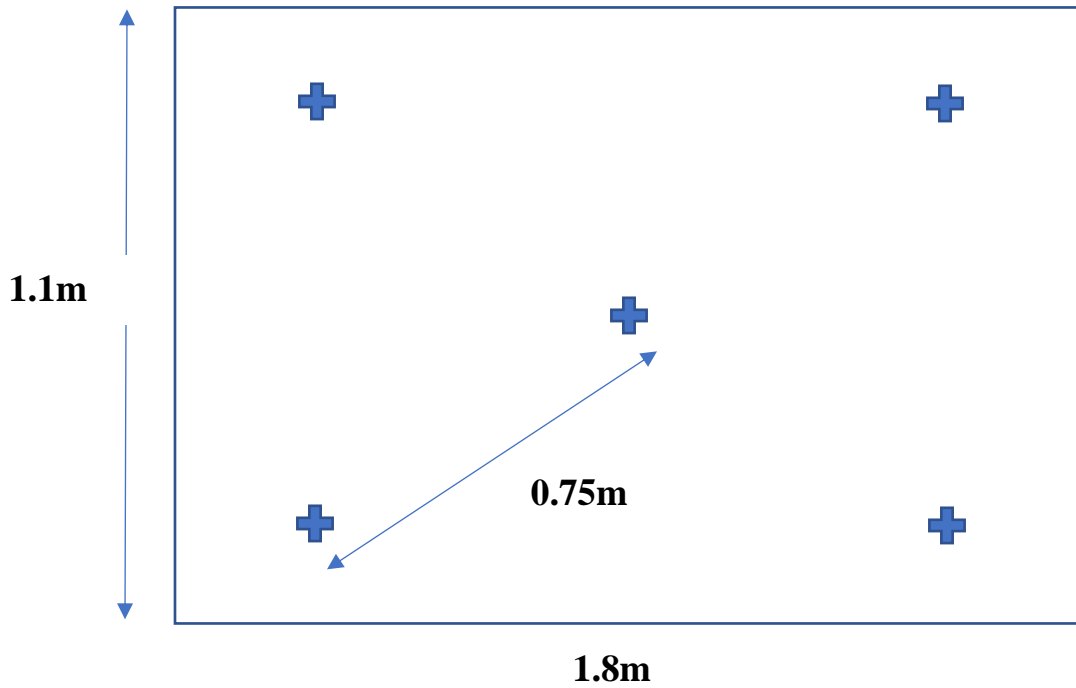
- Platform: you can use any robotic platform for the Surprise challenge. Most of the teams will use LEGO Mindstorms.
- The number of motors/controllers/sensors is not limited
- The robot must be autonomous. No remote control!
- Dimensions: The robot needs to fit in the starting area. Height is not limited.

## 3. Game Field

You need an area measuring approx. 1.8 m X 1.1 m.

- Make a center cross with tape
- Make a cross in each corner with tape, at 0.75m from the center
- Your playing field is ready!

## Playing Field

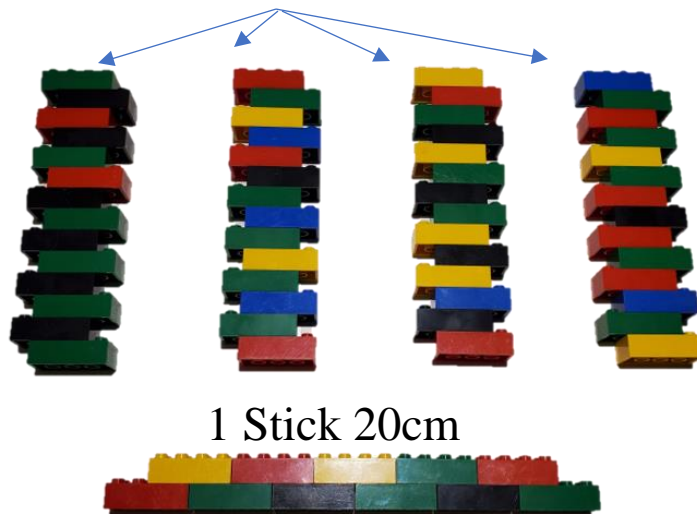


## 4. Game Objects and Positioning

### Game Objects

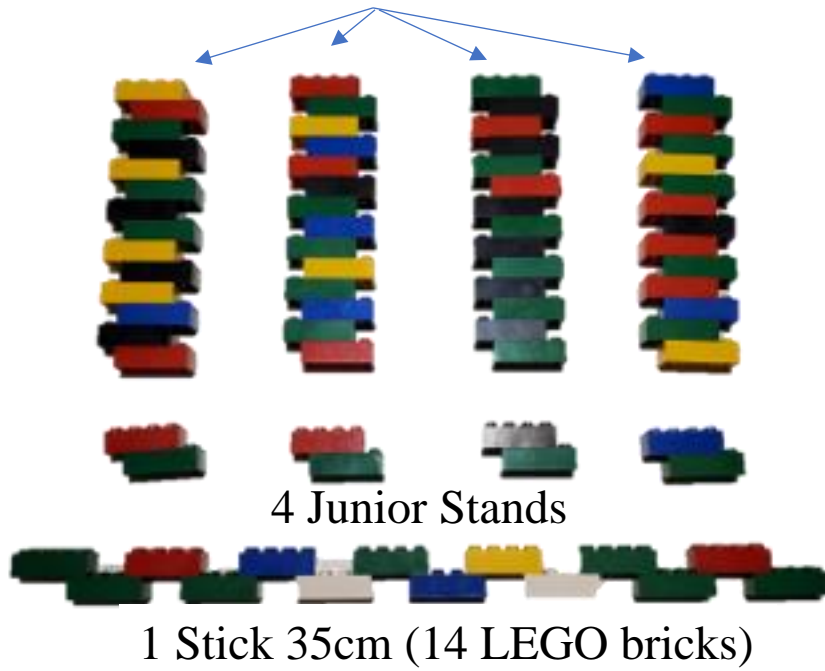
### Elementary

4 Table Legs (14 LEGO bricks)



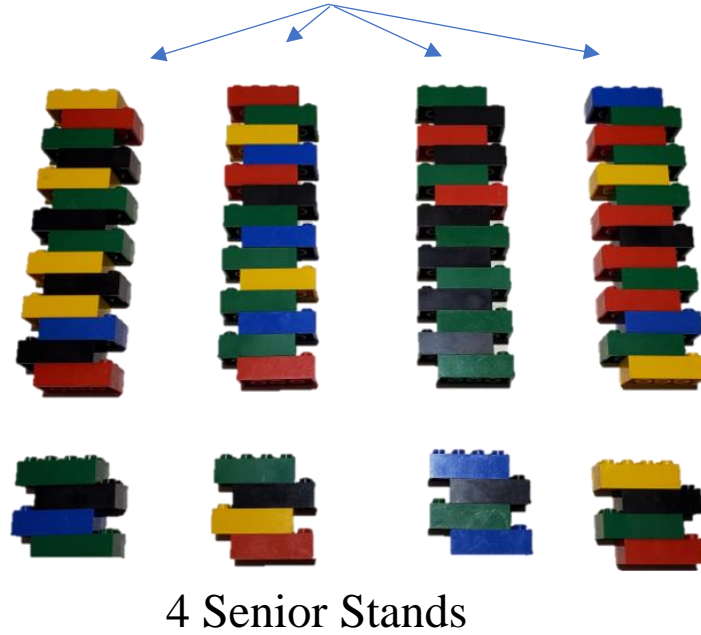
Junior

4 Table Legs (14 LEGO bricks)



Senior

4 Table Legs (14 LEGO bricks)



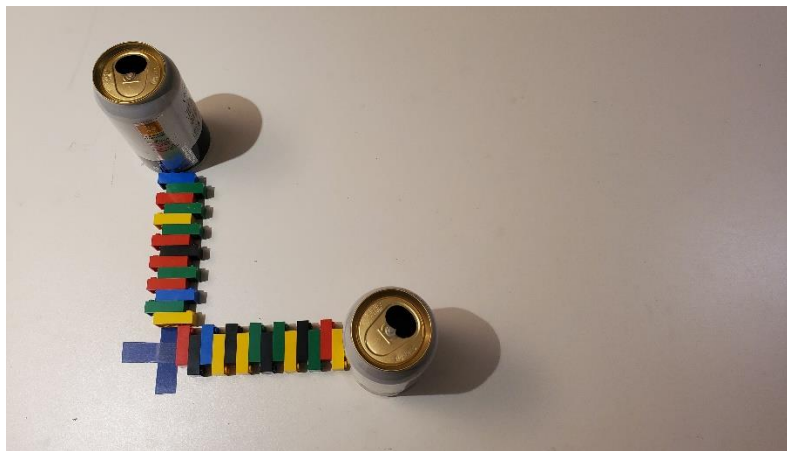
You also need those objects

- 4 buckets (aluminum can)
- Hard Cover Book
- Tape to make lines on the field
- Sheets of paper A4 or Letter

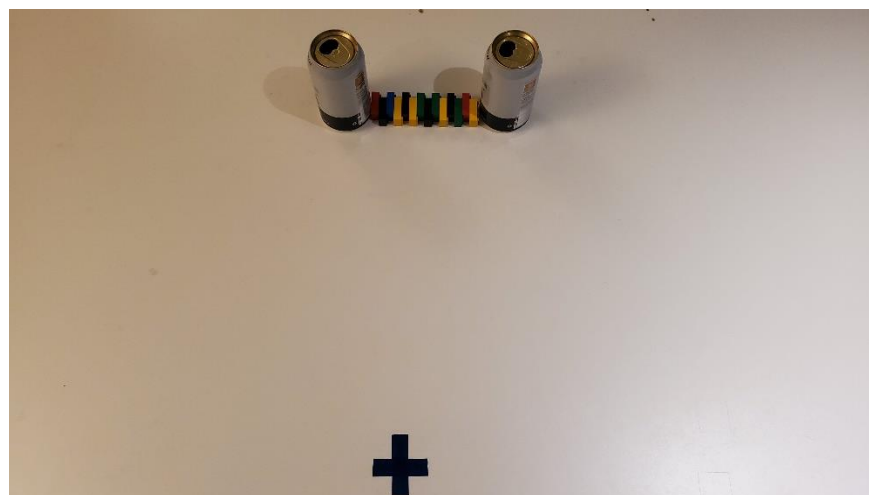


## Positioning

Using two table legs as guides, place two buckets in the bottom left corner of the playing field



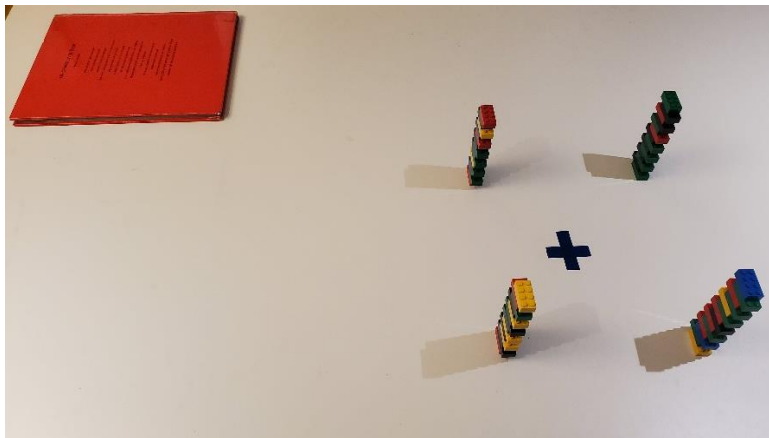
Using a table leg as a guide, place two buckets somewhere in the center top of the playing field



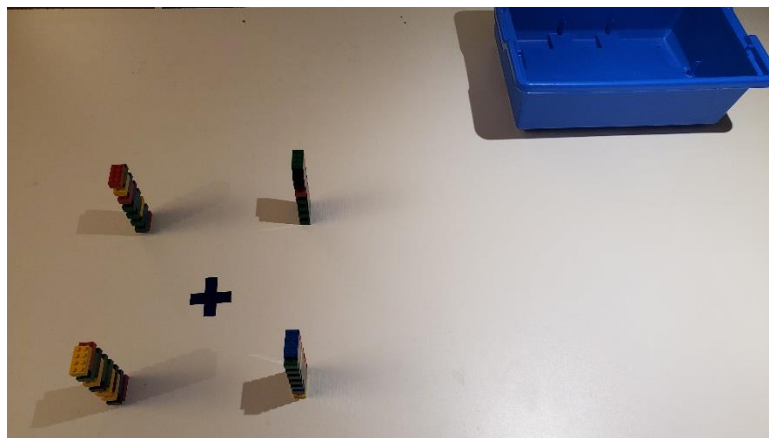
Place the 4 table legs in the center to match the corners of your book. The book is the tabletop.



Remove the book and place it on the top left cross. The book is the starting position of the robot



Place the box on the top right cross



**Elementary:** Place the 20 cm stick next to the box.



**Junior:** Place the 35 cm stick next to the box

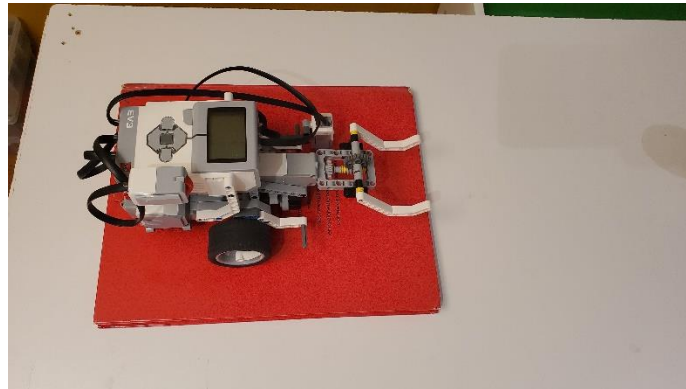


## 5. Missions

### At the camera before the start

- Show up at the camera with your team number marked on a sheet of paper
- Open your book to show it is a real one with real pages

### Place the robot on the book on the starting position



### Start the official web [chrono](#), then start the robot

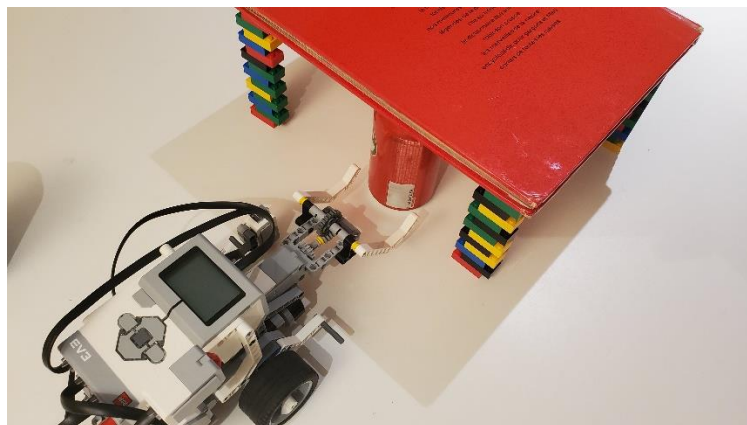
- After the robot leaves the book, a team member places the book on the table legs

IN ANY ORDER AFTER THE ROBOT STARTS:

### Bring the 4 buckets of maple sap to the sugar shack table

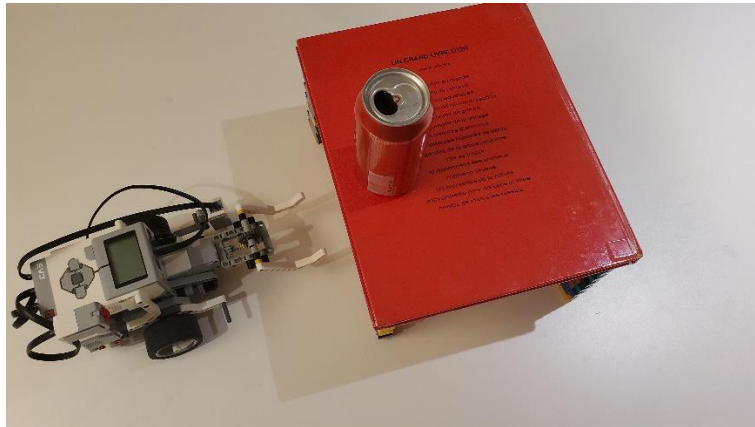
- **Elementary:** place the buckets completely UNDER the table

**\*If your buckets do not fit under the table, you are allowed to add LEGO bricks to the legs to elevate the tabletop.**





**Junior and Senior:** place the buckets ON the table



### Make snowballs and throw them in the box

- A team member shall crumple standard sheets of paper to make two snowballs! This action shall be visible to the camera.



- The team member loads 1 or 2 snowballs in the robot when the robot is on the bottom right cross.
- The robot throws the snowballs in the box from a distance. No part of the robot can get within the minimum distance to throw the snowballs.
  - **Elementary:** 20 cm away
  - **Junior:** 35 cm away
  - **Senior:** 50 cm away (throw from the bottom right cross)



## 6. Bonus points

### Elementary, Junior, Senior

- Get bonus points if the robot is not touching any outside objects or walls
- Get bonus points for placing, before starting the robot, 4 blank sheets of paper around the sugar shack table, one sheet per side. This will simulate additional snow!



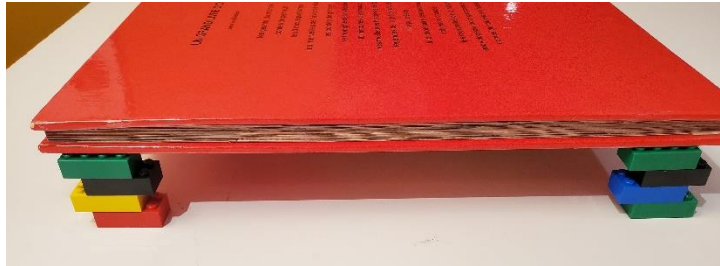
### Junior only

- Get bonus points by elevating the book at the starting position using the 4 Junior stands, one in each corner



## Senior only

- Get bonus points by elevating the book at the starting position using the 4 Senior stands, one in each corner



- Get bonus points for placing a bucket on another bucket on the table



- Get bonus points for turning a bucket upside down on the ground momentarily



## Scoring Elementary

<b>Tasks</b>	<b>Each</b>	<b>Total</b>
Show team number	1	1
Show it is a real book	1	1
Start on the book	2	2
Buckets UNDER the table	2	8
Snowballs made and loaded	2	4
Snowballs thrown in the box	4	8
<b>Bonus points</b>		
Do not touch any wall	2	2
4 blank sheets around the table	3	3
<b>Maximum Score</b>		<b>29</b>

## Scoring Junior

<b>Tasks</b>	<b>Each</b>	<b>Total</b>
Show team number	1	1
Show it is a real book	1	1
Start on the book	2	2
Buckets ON the table	2	8
Snowballs made and loaded	2	4
Snowballs thrown in the box	4	8
<b>Bonus points</b>		
Do not touch any wall	2	2
4 blank sheets around the table	3	3
Elevate the book in start area	3	3
<b>Maximum Score</b>		<b>32</b>

## Scoring Senior

<b>Tasks</b>	<b>Each</b>	<b>Total</b>
Show team number	1	1
Show it is a real book	1	1
Start on the book	2	2
Buckets ON the table	2	8
Snowballs made and loaded	2	4
Snowballs thrown in the box	4	8
<b>Bonus points</b>		
Do not touch any wall	2	2
4 blank sheets around the table	3	3
Elevate the book in start area	3	3
Bucket on bucket	2	4
Bucket upside down	2	2
<b>Maximum Score</b>		<b>38</b>