Rocky Mountain BEST
2018 Kickoff
September 15, 2018
STRIVE Prep-Rise School
at Regis F. Groff Campus
<table>
<thead>
<tr>
<th>Time</th>
<th>Event</th>
</tr>
</thead>
<tbody>
<tr>
<td>12:00 – 12:45</td>
<td>Kit Pickup in parking lot</td>
</tr>
<tr>
<td>1:00</td>
<td>Opening Remarks</td>
</tr>
<tr>
<td>1:05</td>
<td>Roll Call, Season Overview, and Awards &amp; Judging Overview</td>
</tr>
<tr>
<td>1:20</td>
<td>Rules Overview and Kit Pickup Instructions</td>
</tr>
<tr>
<td>1:30</td>
<td>Reveal the 2018 Game and Protobot Demo</td>
</tr>
<tr>
<td>1:50 – 2:15</td>
<td>Photos / Videos of Game Floor</td>
</tr>
<tr>
<td>1:50 - 4:00</td>
<td>Kit Pickup in parking lot</td>
</tr>
<tr>
<td>2:15 – 3:15</td>
<td>Breakout Training Sessions in classrooms</td>
</tr>
<tr>
<td>3:20 – 3:50</td>
<td>Q&amp;A in gym</td>
</tr>
</tbody>
</table>
Opening Remarks

Welcome to Kickoff & Start of BEST Season - Carolyn Bauer, Hub Director

• Announcements
• Thanks - STRIVE Prep-RISE
• Recognize Major Sponsors
• Thanks to Board, Steering Team & Volunteers
• Strive-Guest
• p3RsevEr@nce!

And many generous individual Contributors
What is BEST?

- Student Teams have 6 weeks to design, develop and test their robot. Each team receives identical parts kit, but the resulting robots are each ingeniously unique.
- Student teams are guided by professional mentor and school coaches.
- Winning teams from each Hub compete at a Regional Championship.

School participation is cost-effective:
- No registration fee & robot building kit and materials are provided at no cost.
- Schools only fund their T-shirts, travel & BEST Award booths.
New for BRI this year

All participants register

Beginning this year:

- All team members (students, teachers, mentors) should individually register in the BEST National Registry (http://bestnationalregistry.eventbrite.com) prior to competing on Game Day.
- Handout explaining this process is at MAIN / 2018 Game Files / Handouts.
- Consent and Release forms are still required from all participants.
# Roll Call of Schools

<table>
<thead>
<tr>
<th>Team #</th>
<th>School</th>
<th>District/City</th>
<th>Team #</th>
<th>School</th>
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<tbody>
<tr>
<td>1301</td>
<td>Abraham Lincoln High School</td>
<td>Denver</td>
<td>1315</td>
<td>Monarch High School</td>
<td>Boulder Valley</td>
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<tr>
<td>1302</td>
<td>Aurora Frontier P-8</td>
<td>Aurora</td>
<td>1316</td>
<td>Montrose High School - NJROTC*</td>
<td>Montrose</td>
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<tr>
<td>1303</td>
<td>Aurora Quest</td>
<td>Aurora</td>
<td>1317</td>
<td>Mrachek Middle School</td>
<td>Aurora</td>
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<tr>
<td>1304</td>
<td>Bishop Machebeuf High School</td>
<td>Denver</td>
<td>1318</td>
<td>New Vista High School</td>
<td>Boulder Valley</td>
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<tr>
<td>1305</td>
<td>Broomfield High School</td>
<td>Boulder Valley</td>
<td>1319</td>
<td>North Middle School</td>
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<tr>
<td>1306</td>
<td>Columbine Middle School</td>
<td>Montrose</td>
<td>1320</td>
<td>Sacred Heart of Jesus School *</td>
<td>Boulder</td>
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<tr>
<td>1307</td>
<td>Denver School of Innovation and Sustainable Design</td>
<td>Denver</td>
<td>1321</td>
<td>Skinner Middle School</td>
<td>Denver</td>
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<tr>
<td>1308</td>
<td>DSST: Byers</td>
<td>Denver</td>
<td>1322</td>
<td>Skyline High School</td>
<td>St. Vrain Valley</td>
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<tr>
<td>1309</td>
<td>DSST: Cole High School</td>
<td>Denver</td>
<td>1323</td>
<td>St Mary's Academy Middle School</td>
<td>Englewood</td>
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<tr>
<td>1310</td>
<td>DSST: Stapleton High School</td>
<td>Denver</td>
<td>1324</td>
<td>STRIVE Prep – RISE</td>
<td>Denver</td>
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<tr>
<td>1311</td>
<td>East Middle School</td>
<td>Aurora</td>
<td>1325</td>
<td>STRIVE Prep – Excel *</td>
<td>Denver</td>
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<tr>
<td>1312</td>
<td>Gateway High School</td>
<td>Aurora</td>
<td>1326</td>
<td>Thomas Jefferson High School</td>
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<tr>
<td>1313</td>
<td>Heath Middle School</td>
<td>Greeley</td>
<td>1327</td>
<td>Westgate Community School</td>
<td>Adams 12</td>
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<tr>
<td>1314</td>
<td>John F Kennedy High School</td>
<td>Denver</td>
<td>1328</td>
<td>Westminster High School *</td>
<td>Westminster</td>
</tr>
<tr>
<td></td>
<td>* Rookie team</td>
<td></td>
<td></td>
<td>DSST: College View High School*</td>
<td>Denver</td>
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</table>

(ALTERNATE)
<table>
<thead>
<tr>
<th>EVENT</th>
<th>Date, Time, Location</th>
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</thead>
<tbody>
<tr>
<td>Rocky Mountain BEST Kickoff</td>
<td>Saturday, September 15, Noon-3PM</td>
</tr>
<tr>
<td></td>
<td>• STRIVE Prep-RISE</td>
</tr>
<tr>
<td>BEST Award Decision AND Marketing Presentation</td>
<td>Between September 17 and Oct 1</td>
</tr>
<tr>
<td>Time Slot Sign-up</td>
<td>• via Signup.com links</td>
</tr>
<tr>
<td>Rocky Mountain BEST Practice Day</td>
<td>Saturday, October 20, Noon-4 PM</td>
</tr>
<tr>
<td></td>
<td>• STRIVE Prep-RISE</td>
</tr>
<tr>
<td></td>
<td><strong>9:00am DEADLINE FOR ALL TEAMS</strong></td>
</tr>
<tr>
<td></td>
<td>• Submit all documents in Team Dropbox folder</td>
</tr>
<tr>
<td></td>
<td>• Submit paper copy of Demographics form at Robot Compliance</td>
</tr>
<tr>
<td></td>
<td><strong>8am-5pm</strong></td>
</tr>
<tr>
<td>Rocky Mountain BEST Game Day</td>
<td>Saturday, October 27, 7:30am-5pm</td>
</tr>
<tr>
<td></td>
<td>• Auraria Event Center (aka Gym)</td>
</tr>
</tbody>
</table>
Practice Day

Saturday, October 20, noon-4pm

• STRIVE Prep-RISE

✓ Turn in your Driver List

✓ Complete Robot Compliance check
  ✓ Submit complete Team Demographics form in your Team’s Folder by 9 AM
  ✓ Bring a hardcopy of your team’s Demographic form

✓ Submit Engineering Notebook pdf file to Team’s Dropbox - by 9AM

✓ Open practice during compliance checks

✓ Dry run your robots in multiple 3- to 5-minute matches

✓ BEST Award Presentations (8am-5pm) - sign up for time slots
Game Day

Saturday, October 27, 8 AM— 5:30 PM

- Auraria Event Center

Team registration opens at 7:30 AM

- Turn in your Driver List
- Complete Robot Compliance check
- Compete in 3-minute matches in seeding phase, wildcard phase, semi-final phase, final phase
- BEST Award – Exhibits (9am – 2pm)
Denver BEST Regional Championship

Saturday & Sunday, December 8 & 9

- Auraria Event Center – signup.com for Saturday times
- Engineering Notebook submittal online by Dec 1

Saturday - December 8

- Complete Robot Compliance Check & Submit Driver List
- Team Robot Practice on two Game Fields
- Team Photos
- BEST Award Booth and Interview & Marketing Presentation Judging

Sunday - December 9

- Compete in 3-minute matches in seeding phase, wildcard phase, semi-final phase, final phase
- Awards Ceremony
Awards & Judging

Awards & Judging Overview
Ben & Kayla Straub
# RM BEST 2018 Awards Overview

## National Mandatory Awards
- Robot Competition “Game” requires Engineering Notebook
- BEST Award
- Founders Award For Creative Design
- Most Robust Design

## Hub Optional Awards
- Software Development
- Best Rookie Team
- Engineering Notebook
- Craftsmanship

## BEST Award – Team Participation is Optional
- Engineering Notebook: 30 pts
- Marketing Presentation: 25 pts
- Team Exhibit and Interview: 20 pts
- Spirit and Sportsmanship: 10 pts
- Robot Performance: 15 pts

If you have questions about the BEST Award, contact kayla.straub@bestinc.org
BEST Award Participation Sign Up

Sign up for BEST Award judging timeslots between September 17 (noon) and October 1 using these links:

- Marketing Presentation Judging – on October 20
- Team Exhibit Judging – on October 27
  - [http://signup.com/go/uuURZRS](http://signup.com/go/uuURZRS)
Engineering Notebook

Required by all teams – NO EXCEPTIONS

Submit your Notebook single PDF file to Your Team Digital Folder (Dropbox)
No later than October 20 at 9:00 am MST

Teachers check your email for your team digital folder invitation.

Notebook score use:
- BEST Award
- Best Rookie Team Award
- Founders Award
- Software Development Award
- Engineering Notebook Award
- On Game Day, determines Wildcard Match competitors
BEST Simulink Design Award

➢ Your Team’s robot program must be created using Simulink.
➢ Awarded to one team at each Regional Championship:
  – Team that best applies the ‘Simulink Support Package for VEX’ based on judging criteria and Robot performance in the competition.
➢ Submit team’s best Simulink model and a link to a short video describing their program design using Simulink.
  
  http://www.bestinc.org/simulink_award/form.php
➢ The winning teams will be awarded:
  – Cash Award
  – Trophy with inscription ‘BEST Simulink Design Award – by MathWorks’
  – MathWorks hat for each team member
  – Show this Mathworks Simulink Intro Video
➢ NOTE – Simulink is one of 3 options for robot control. It is not recommended for rookie schools.

Reference Section 4.3 in the 2018 Competition Rules Document
Current Events
Kickoff

Rules Overview & Season Reminders
Shannon Ragland
It’s All About the Rules

Read all the Rules

1. 2018 BEST Competition Rules
   – General (Generic) (Section 1)
   – Kit (Section 2) (including Kit Lists)
   – Game Specific (Section 3) Current Events RULES
   – Awards and Judging (Sections 4-7)

2. Generic Kit Usage Guide

3. RM BEST Awards & Judging Logistics Plan

4. Team Custom Part Guide – updated in 2018

5. On-line Question and Answer (Q&A) system

Assign someone to check Online Q&A frequently at http://best.eng.auburn.edu/cgi-bin/bestqna.pl

   – Answers can change your interpretation of the field, rules, etc.
   – Answers may supersede the rules.
Files Online & Thumb Drives

• BEST files at: www.bestinc.org / Participant / File Manager/ 2018 Game Files
  – Awards & Judging
  – Field
  – Kit
  – Logos
  – Scoring Manager
  – Rules
  – Software
  – Game Animation
  – Handouts

• RM BEST files at: http://www.rmbest.org/Our Competitions/2018 Competition/
  – Schedule
  – Sign up links
Kit Pickup and Return

TODAY - Send ONLY 2 people & a vehicle

- Drive near our Penske Truck – north parking lot
- Submit **YELLOW** for kit pickup card
- Receive 1 Red Tote & 1 Blue Tote, Plywood, PVC
- Turn in completed Kickoff Exit Survey

Looking ahead to Game Day

- Return Red Tote with returnable items or submit
  *Request for Loan Extension of Returnable Kit form*
- Return Blue Tote and any consumable items you don’t want or need
Kit Pickup

Evie Garrett
Dennis
Campus - 
DPS

Regis F. Groff
Campus

Rental Truck for
KIT PICKUP

STRIVE Prep - 
RISE

E 51st Ave

Rocky Mountain BEST Kickoff
Saturday 15 September
Noon: Teacher Registration and 
Food Truck Available
1 PM: Event Start
~4 PM: Event End

STRIVE Prep – RISE
18250 E 51st Ave, Denver

Green Valley Ranch Blvd
The Big Reveal
Shannon Ragland

BEST Robotics Universal Reveal on Sept 25 means you have a lot of info about the game. TODAY you are seeing it in person.

Game Animation Link (3 1/2 minutes)
No need for password – except for Software
The Big Reveal

Goal - Design and build a prototype robot that works with the Field Scientist and Field Engineer to:

- Remove, sort, recycle ocean garbage and create reef blocks
- Install reef blocks on an artificial reef structure
- Collect data relevant to ocean currents and the health of sea turtles

- Reveal the Game Field

- Summarize Game and do demo

- Protobot on Game Field
Current Events

Game Field

Artificial Reefs

Currents

Gyres for green and yellow

Field Scientists

Field Engineers
Game Demo & Introduction

- Each robot is on a **Current**. Each Current also holds two Rubber Duckies.
- Each set of 4 Gyres is accessible by 2 robots. **Gyres** contain ocean waste scoring pieces and turtle wildlife.
- A robot can deliver scoring pieces (and Sea Turtles) to the **Field Scientist**.
- A robot can deliver scoring pieces to the **Field Engineer**.
- The Field Engineer can assemble scoring pieces into Reef Blocks and make them available for a robot to place onto the **Artificial Reef**.
Currents and Gyres

1. Currents are 14’ long x 3 ½” wide x 3” high and are supported by pylons. Lower end is 60” & higher end is 72” off floor. Two rubber duckies float on each current and contain info about ocean currents.

2. Robot can deliver duckies to Field Scientist to evaluate current info.

3. Four 36” diameter gyres are assessable to each robot: 1 Indian Ocean Gyre, 1 Atlantic Ocean Gyre, and 2 Pacific Ocean Gyres.

4. Gyres are at different heights & distances from currents and spin & wobble.

5. Gyres contain ocean waste: cans, bottles (3 sizes) and microplastics, as well as sea turtles which contain info about their eating habits.

6. Robot can deliver turtles to Field Scientist to determine preferred food, increasing value of that food in the match.
Artificial Reef Structure

1. Artificial reef structure is on end pylon of each current. Each structure contains 3 level “planes” for installing reef blocks & filament tubes.
2. Each structure also has receiving platform.
3. Robot delivers ocean waste to Field Engineer. Field Engineer compiles waste into appropriate reef blocks & filament tubes and places on Receiving Platform.
4. Robot moves reef blocks & filament tubes to 3 planes to score additional points.
Game Field Pieces - Ocean Garbage

10.75 oz. soup cans

Microplastics

8 oz. plastic water bottle

16 oz. plastic water bottle

1 L plastic water bottle
Game Field Pieces

Wildlife – Sea Turtle

Data Assessment of Currents – Rubber Ducky
Game Demo & Introduction

Scoring Opportunity 1 – Remove ocean waste, rubber duckies, sea turtles

- Score when cans, bottles, microplastics, duckies are in Field Engineer’s Recycling box (orange box below)
- Score when cans, bottles, microplastics, duckies, turtles are in Field Scientist’s Habitat box (orange box below)
Scoring Opportunity 2 – Completed Reef Blocks/Filament Tubes

- Score when 4 cans, 4 identically sized bottles have been placed into correct Large (pink box below) or Small (blue box below) Reef blocks in Field Engineer’s Operating Area
- Score when 8 microplastics have been placed into Filament Tube Container (green box below) in Field Engineer’s Operating Area
Scoring Opportunity 3 – Install Reef Block / Filament Tube on Reef Structure

• Score when robot moves reef block / filament tube from Receiving platform onto any of the 3 planes with filament tubes in a PVC tube and boxes onto shelves or other boxes

Scoring Opportunity 4 – Sea turtle bonus

• Score double for garbage inside turtle

Scoring Opportunity 5 – Current Flow Analysis

• Score when current flow has been correctly identified

Flexibility Bonus - See Section 3.6.4 of rules
### Scoring Summary

<table>
<thead>
<tr>
<th>Location</th>
<th>Possible Items</th>
<th>Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>Field Engineer’s Recycling Box</td>
<td>8 oz., 16 oz. 1 L bottles, 10.75 oz. cans, rubber duckies</td>
<td>10 pts each</td>
</tr>
<tr>
<td>Microplastics</td>
<td></td>
<td>5 pts each</td>
</tr>
<tr>
<td>Field Scientist’s Habitat Box</td>
<td>8 oz., 16 oz. 1 L bottles, 10.75 oz. cans, rubber duckies (including each turtle)</td>
<td>10 pts each</td>
</tr>
<tr>
<td>Microplastics</td>
<td></td>
<td>5 pts each</td>
</tr>
<tr>
<td>Completed Reef Block in Field Engineer’s Operational Area</td>
<td>8 oz., 16 oz. 1 L bottles, 10.75 oz. cans</td>
<td>25 pts for each block</td>
</tr>
<tr>
<td>Microplastics</td>
<td></td>
<td>50 pts for each tube</td>
</tr>
<tr>
<td>Completed Filament Tube in Field Engineer’s Operational Area</td>
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</table>
### Scoring Summary (Cont.)

<table>
<thead>
<tr>
<th>Location</th>
<th>Possible Items</th>
<th>Points</th>
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</thead>
<tbody>
<tr>
<td>Installed Reef Block/Filament Tube on Reef Structure</td>
<td>Reef Block Filament Tube</td>
<td>100 pts for each block 100 pts for each tube</td>
</tr>
<tr>
<td>Sea Turtle Bonus</td>
<td></td>
<td>2x pts for garbage found inside turtle See 3.6.3.1 in rules</td>
</tr>
<tr>
<td>Current Flow Analysis</td>
<td></td>
<td>150 pts See 3.6.3.2 in rules</td>
</tr>
<tr>
<td>Flexibility Bonus</td>
<td></td>
<td>See 3.6.4 in rules</td>
</tr>
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</table>
Photos / Videos

Please **do not** enter the game field

- Field components are fragile and can be easily damaged
  - Please Be CAREFUL!
- Game field pieces are easily damaged or disorganized
- Ask a Referee or Volunteer to demo items
# Breakout Training Sessions

<table>
<thead>
<tr>
<th>Location</th>
<th>Presentation</th>
<th>Tickets</th>
<th>Presenter</th>
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<tbody>
<tr>
<td>167</td>
<td>Robot Kit &amp; Rules</td>
<td>4</td>
<td>JoAnne Fry</td>
</tr>
<tr>
<td>159</td>
<td>Intro to Engineering Notebook</td>
<td>2</td>
<td>Linda King</td>
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<tr>
<td>152</td>
<td>The BEST Award Competition</td>
<td>2</td>
<td>Ben &amp; Kayla Straub</td>
</tr>
<tr>
<td>160</td>
<td>Intro to Simulink</td>
<td>1</td>
<td>Evan Brink &amp; Leon Roell</td>
</tr>
<tr>
<td>161</td>
<td>Teacher and Mentor Tips</td>
<td>1</td>
<td>Dave Gesler &amp; Lois Walton</td>
</tr>
<tr>
<td>151</td>
<td>Intro to BEST Control Systems</td>
<td>2</td>
<td>Dave Wilkerson</td>
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<tr>
<td>163</td>
<td>Intro to easyC (second session at 3:20 PM)</td>
<td>1</td>
<td>Mike King</td>
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<tr>
<td>164</td>
<td>Intro to RobotC (ends at ~ 4:00 PM)</td>
<td>1</td>
<td>Kevin Barrett</td>
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<tr>
<td>GYM</td>
<td>Robot Design and Construction Tips</td>
<td>n/a</td>
<td>Scott McEwen</td>
</tr>
</tbody>
</table>

**NOTE** – extra chairs are on racks in the hallways near the classrooms!

**RETURN TO THE GYM FOR Q&A at 3:20**
Kickoff Breakout Session

Robot Design & Construction Tips
Scott McEwen
The Great Pacific Garbage Patch – The Ocean Cleanup

2 min 40 sec video

https://www.theoceancleanup.com/great-pacific-garbage-patch/
<table>
<thead>
<tr>
<th>WHO</th>
<th>HASH TAGS</th>
<th>EXAMPLE</th>
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</thead>
<tbody>
<tr>
<td>Students</td>
<td>#Thanks2BESTRobotics #BESTRobotics25Years</td>
<td>#Thanks2BESTRobotics I'm pursuing a degree in engineering #BESTRobotics25Years</td>
</tr>
<tr>
<td>Alumni</td>
<td>#Thanks2BESTRobotics #AlumniBESTStudents #BESTRobotics25Years</td>
<td>#Thanks2BESTRobotics I landed my dream job @Google #AlumniBESTRobotics #BESTRobotics25Years</td>
</tr>
<tr>
<td>Teachers</td>
<td>#Thanks2BESTRobotics #ITeachBESTstudents #BESTRobotics25Years</td>
<td>#Thanks2BESTRobotics #ITeachBESTstudents so they can move us forward in the field of science #BESTRobotics25Years</td>
</tr>
<tr>
<td>Mentors</td>
<td>#Thanks2BESTRobotics #IMentorBESTstudents #BESTRobotics25Years</td>
<td>#Thanks2BESTRobotics #IMentorBESTstudents to pass the torch to tomorrow’s engineers #BESTRobotics25Years</td>
</tr>
<tr>
<td>Volunteers</td>
<td>#Thanks2BESTRobotics #IVolunteer4BEST #BESTRobotics25Years</td>
<td>#Thanks2BESTRobotics #IVolunteer4BEST to give back to my community #BESTRobotics25Years</td>
</tr>
</tbody>
</table>
Q&A

TEACHERS PLEASE TURN IN YOUR SURVEYS

Carolyn Bauer, Carolyn Hickey, Ben and Kayla Straub, and Shannon Ragland

• Questions about:
  – Game?
  – Kits?
  – Events?
  – Awards-Game, Special or BEST Award