MAKESHIFT 4039

A Successful FLL Season the Make*Shift* way

October 1, 2016

2056 Conference

FLL FIRST® LEGO® League

A Successful FLL Season

1. welcome and congratulations
2. me and GARF
3. success
4. FLL – overview of a season
5. the *FIRST* step
6. the *FIRST* team meeting
7. the typical team meeting
8. the robot and the robot game
9. the Project
10. resources
11. questions

…all in 60 minutes

GARF, Make*Shift*, and me

GARF:

- Guardian Angels Robot Force - established in 2007
- Champion's Award (2nd) in 2012
- North American Open Championship 2012

Make*Shift* Robotics:

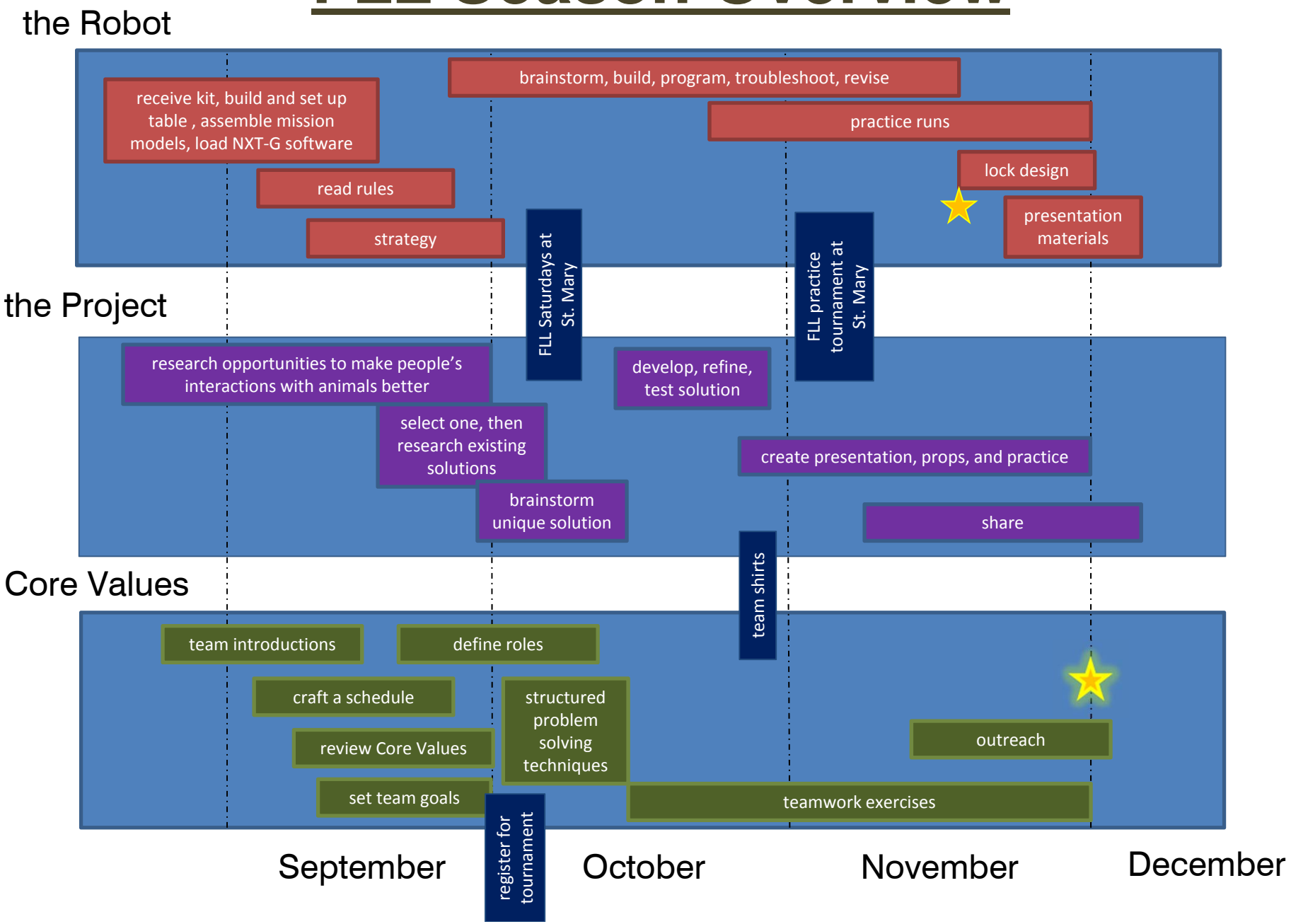
- St. Mary FRC team 4039 – established in 2011
- Woodie Flowers Finalist Award – Waterloo 2014
- Chairman's Award – Finger Lakes 2015

Engineering manager at a multi-national robotics company

A "Successful" Season

- definition of success
- setting and attaining goals
- different for every team
- there are a million ways to do things

FLL Season Overview



the *FIRST* step

seven things the coach is likely to have just done or is just about to do:

1. confirm your registration
2. identify a meeting place
3. determine meeting times
4. arrange access to a computer
5. receive your Mindstorms robot kit (rookies only), and challenge set (playing mat and mission models)
6. recruit your team
7. schedule your first meeting

the *FIRST* team meeting

1. *FIRST* Lego League - introduction
2. team rules
3. teamwork exercise
4. draw up a Gantt chart
5. start building mission models
6. define roles
7. anyone know an expert?
8. start an engineering log book
9. homework = roboteers and coach read the mission descriptions and rules

successful team meetings

Every team is unique – GARF met for two hours, twice a week:

5 minutes

- review any new research, game updates, e-mails from *FIRST*
- compare progress to schedule, upcoming field trips, number of meetings remaining to tournament

50 minutes

- robot – split into builders, programmers, mission specialists
- 2-1/2 minutes of magic

10 minutes

- snack (rotation) and teamwork challenge

50 minutes

- Project – research, communications, presentation
- rehearsal

5 minutes

- wrap up, homework, next meeting

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the Robot

1. **LEGO Mindstorms hardware**
   - NXT or EV3 brick = the brain
   - outputs = motors
   - inputs = sensors (touch, ultrasonic, light, and colour)
   - building blocks = traditional studded bricks, un-studded Technic parts including wheels, gears, axles, pins, buckets, and anything else made by LEGO

2. **NXT-G and EV3 programming software**
   - launching
   - writing a simple program
   - downloading to the robot – Bluetooth or serial
   - saving the program on the laptop
   - commanding sequential moves
   - sensor inputs
   - sequencing to next program

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the Robot Game

chapter 5 of coaches' handbook

1. read (and re-read) the rules and definitions
2. this is an engineering challenge
3. brainstorm solutions
4. keep it simple
5. risk/reward strategy – time is your most precious resource
6. localization
7. repeatability
8. coaches should use every opportunity to reinforce the real-life application of math and science principles

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the Project

chapter 6 of coaches' handbook

1. research/discover
2. narrow it down
3. brainstorm unique solution
    - develop, refine, test
4. prepare presentation
    - five-minutes (skit, rap, puppet show…)
5. share
    - family, classmates, Science Centre, scientists, engineers, etc
    - those who could benefit

Core Values

chapter 4 of coaches' handbook

1. refer often to FLL Core Values and Gracious Professionalism – point out examples throughout the season
2. split up the work - agree on roles
3. employ structured problem solving at every opportunity
4. review rubrics prior to tournament
5. see sample team-building exercises from GARF

Structured Problem Solving

1. **Assign** roles (30 seconds)
   - leader and timekeeper
2. **Define** problem (1 minute)
   - what needs to be done?
   - what does not need to be done?
   - what limits are there on time or resources?
   - ask questions if unsure

3. **Brainstorm** solutions (1 minute)
   - one brief idea from each and every roboteer – no criticism
   - choose one - how do we get agreement?
4. **Implement** (2 minutes)
   - build, test, re-build as necessary
5. **Celebrate** (30 seconds)
   - check that original problem was addressed
   - team cheer

the Tournament

chapter 7 of coaches handbook

"a celebration more than a competition"

- arrival and orientation
- robot matches
- Robot judging
- Project judging
- Teamwork (Core Values) judging
- awards – set expectations; the robot <u>will not</u> work the way it did in practice, not everyone gets a trophy

Resources

chapter 4 of coaches' handbook

Coaches' handbook: included with kit, season overview, great checklists!

http://www.firstinspires.org/robotics/fll – official *FIRST* website

http://fllontario.blogspot.ca – Dave's blog, coach training, tournament listings, training resources

http://www.firstroboticscanada.org/main/fll-tournament-registration – tournament registration

http://www.firstinspires.org/resource-library/fll/animal-allies-challenge-updates-and-resources- resource library)

https://firstinspiresst01.blob.core.windows.net/fll/animal-allies-challenge-updates.pdf - official robot game updates (check regularly)

http://forums.usfirst.org/forumdisplay.php?24-FIRST-LEGO-League - unofficial team forums – anything and everything for coaches (and coaches only)

www.stemcentric.com/nxt-tutorial - programming tutorials

http://www.firstinspires.org/resource-library/fll/judging-rubrics- judging rubrics, awards descriptions

www.freewebs.com/roboteering – GARF's website

www.bricklink.com – online LEGO parts of all descriptions

www.youtube.com – see what other teams are coming up with

- your local public library!

the four (ok, five) things

(every FLL team should know)

1. set goals
2. the kids do the work - assign roles and responsibilities, coach's ask questions
3. meetings = 1/3 robot + 1/3 project +1/3 teamwork… plus snacks!
4. ask for help when you need it – mentors, FRC teams, teachers/parents, other teams, and forums
5. **have fun!** *FIRST* is about getting kids excited about science and technology – this is how you should judge the success of your season

A Successful FLL Season

- define success for you
- plan your season - Gantt
- work your meetings
- ask for help
- have fun!

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A Successful FLL Season the Make*Shift* way

Questions?

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