FIRST GAME CHANGERS

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STAR WARS
FORCE FOR CHANGE

2021 FIRST ROBOTICS COMPETITION GAME DESIGN POST

FIRST® Alumni
AND ROBOTICS AT OHIO STATE®
Robot in 3 Days

FIRST ROBOTICS COMPETITION

THE OHIO STATE UNIVERSITY
COLLEGE OF ENGINEERING

Table of Contents:

Epigraph:

Basic idea is to provide our alumni knowledge of what worked and what didn't in past years to provide FRC members with knowledge to help them design their own game. This allows current students and rookies who are not familiar with previous games to get input from students who have experiences and participated in these games. While watching youtube videos and reading game descriptions are extremely helpful, getting alumni input is also equally important and helpful.

The two main sections are:

- Information on past games such as game elements and field elements

- Discussion on game strategy/mechanics and game theme

At the end of each chapter is a **takeaway/TLDR** our team decided that should be noted.

Visit our site at https://firstrobotics.osu.edu/!

For any questions, reach out to us at firstrobotics@osu.edu!

Style:

Infinite Recharge

2020

GAME ELEMENTS:

1. Control Panel
   - What worked:
     - It was a new and interesting concept that inspired different types of designs
   - What didn't:
     - Scoring was unbalanced

Notes: **Underutilized**

2. Generator Switch
   - What worked:
     - Good for points
     - Reliable
     - Fun to navigate
   - What didn't:
     - Cluttered
     - People got hit in the head
     - Too cluttered and

Notes: **Safety hazard**

3. Fuel Cells
   - What worked:
     - A generic and familiar game element
   - What didn't:
     - Unbalanced point system for high and low goals

Notes: **Easily destroyed**

GAME STRATEGY:
   - Good - boundaries were interesting and changed up the game a bit
   - Bad - not enough information, lack of games

GAME DESIGN:
   - Good - Fun and engaging
   - Bad - was it really Star Wars-themed tho?

Takeaway: Don't have it during a pandemic (aka we don't have enough info).

Style:

Deep Space

2019

GAME ELEMENTS:

1. Cargo
- What worked
    - Hatch interaction was….interesting
    - Interaction and placement was simple but fun
- What didn't
    - Too Bouncy?
    - Placement on the field was annoying

Notes: **Bouncy?**

2. Hatch
- What worked
    - New, interesting game element to interact with and engineer for
    - Easy to use and difficult to damage
- What didn't
    - Velcro worn, general wear and tear was excessive
    - Placing into the field was annoying

Notes: **Velcro is not the best material**

3. HAB
- What worked
    - A lot of teams just yeeted the robot onto it
    - Cool innovative designs to climb; wasn't just a bar like the past two years and the following year
    - Slippery material was interesting
- What didn't
    - Falling off could cause catastrophic damage to the robot that teams don't really want

Notes: **Risk Robot damage**

GAME STRATEGY:
- Defense was balanced
- Numerous areas to score points
- Points were balanced, low scoring games were close
- Lack of autonomous had **mixed** reviews

GAME DESIGN:
Interesting and different elements

Takeaway: Progressive element interaction was interesting. There were numerous areas to score in.

Style:

Power Up

2018

GAME ELEMENTS:

1. Scales/switches
    - What worked
        - Possession game
        - Balanced
        - LED indicator system was on point, amazing, tremendous, great
        - Randomization was really cool and interesting
    - What didn't
        - Broken scales
        - Robots getting stuck
        - Launching was weird

Notes: **Scales broke a lot**

2. Power Cubes
    - What worked
        - Robust
        - Easy to use at home; easy to get an alternative element to practice on
        - Fun to manipulate
        - New since it was a cube as opposed to balls
    - What didn't
        - The top face had less grip since the box was "open"

Notes: **Easy and new**

3. Vault
    - What worked
        - Easy to use
        - Interesting strategy with the powerups
    - What didn't
        -

Notes: **New strategy**

3. Climb
- What worked
    - Climb to a certain height was good
- What didn't
    - The bar was too small, piggyback climbing was overpowered

Notes: **Small bar**

GAME STRATEGY:
- Simple and straightforward strategy

GAME DESIGN:
- Retro arcade theme was new and engaging

Takeaway: Possession game concept and power up concept were both interesting. Piggyback climb is dangerous and should be avoided.

Style:

Steamworks

2017

GAME ELEMENTS:

1. Fuel
- What worked
    - Durable
    - Easy to interact with
- What didn't
    - Unbalanced point system
    - Mess for volunteers; backed up matches

Notes: **FIRST themselves said it was a bad idea; don't use it!**

2. Airship climb
- What worked
    - Being able to use your own rope allowed for more design choices
- What didn't
    - Time-consuming to set up and takedown
    - Ambiguity to use velcro was horrible

Notes: **Using your own equipment?**

3. Gears
- What worked
    - Durable
    - Fun and interesting shape
- What didn't
    - The holes made it annoying

Notes: **Different ways to interact**

4. Airship
- What worked
    - Delivering game elements to humans was fun
    - Humans being in the field was absolutely amazing and tons of fun
    - Different communication strategy like screaming
- What didn't
    - Airship springs(the ones to hold the gear) consistently broke and they would run out
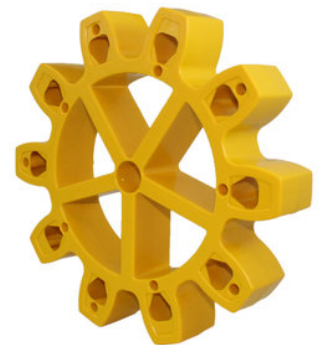
- ○ The dividers did NOT do their job as intended and actually inhibited teams from scoring well

Notes: **Easily broken, but come on people were on it**

GAME STRATEGY:
- Scoring and element pickup was on different sides of the field allowing for more robot interaction and strategy
- Autonomous was fun

GAME DESIGN:
- The steampunk theme was loved by all
- Field automation for real-time scoring worked well

Takeaway: Lots of small game elements are bad. The human player role was amazing.

Style:

Stronghold

2016

GAME ELEMENTS:

1. Defense
- What worked
  - The configurable defense made it fun to strategize
  - Fun variety of defenses to choose from
- What didn't
  - Gave people migraines
  - Game elements weren't as robust as they should be

Notes:

2. Boulders
- What worked
  - Easy to manipulate
- What didn't
  - Tore often

Notes:

3. Tower Scoring
- What worked
  - LED indicators worked well
  - Scoring balanced
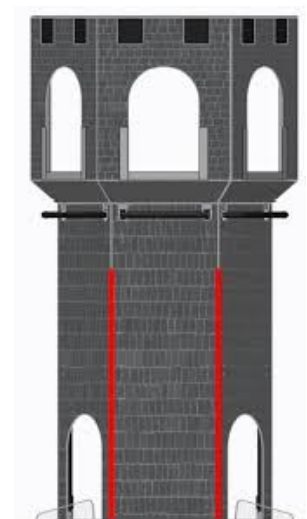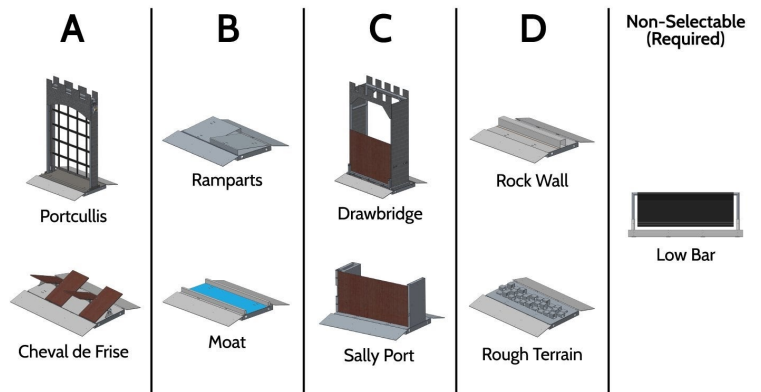- What didn't
  - Balls would bounce out after being scored

Notes:

4. Tower Climbing
- What worked
  - Fun, innovative designs from teams
- What didn't
  - Pretty high, hard to get down

Notes:

GAME STRATEGY:
- Scoring ambiguity was a bit much, **more field automation preferable**

GAME DESIGN:
- Cheering for game elements was interesting; lots of audience interaction

Takeaway: Player/audience interaction is interesting, but could be done better. Moving to theme-based was a great idea.

Style:
Recycle Rush
2015

GAME ELEMENTS:

1. Pool Noodles
   - What worked
     - Interesting element choice(shape)
   - What didn't
     - Hard to work with in every way
Notes:

2. Totes
   - What worked
     - Sturdy
     - Veteran teams can use their own totes(from FIRST) to practice on
   - What didn't
     - Dangerous when stacked so high
Notes:

3. Trash can
   - What worked
     - Sturdy
   - What didn't
     - Fell over a lot
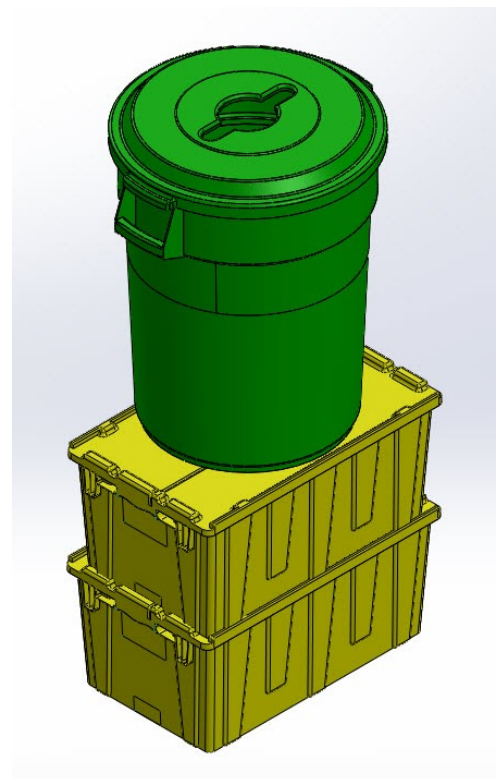Notes: Interesting game element form factor; hard to design for

GAME STRATEGY:
   - Good
     - The human player role was fun
   - Bad
     - No bumpers
     - No max frame perimeter
     - Only one design that worked; **little creative freedom**

GAME DESIGN:
Was it fun? No. Bad.

Takeaway: Don't.

Style:

Aerial Assist

2014

GAME ELEMENTS:

1. Ball(Yoga ball)
   - What worked
     - Fun to design for
   - What didn't
     - A few popped

Notes

2. Goals(High/Low)
   - What worked
     - Nice to have the option
     - Easy and engaging autonomous for rookie teams
   - What didn't
     -

Notes:

3. Truss
   - What worked
     - A lot of fun to play with
   - What didn't
     - Little low so people hit their heads on it

Notes:
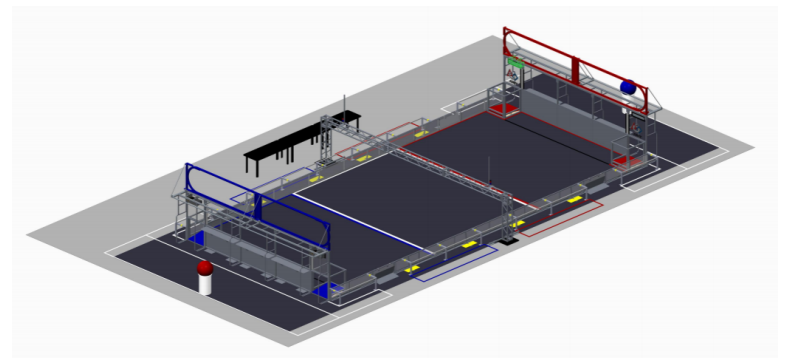

GAME STRATEGY:

Lots of fun making robots give elements to each other; lots of teamwork between teams
Hard for poorly designed robots to compete at all

GAME DESIGN:

The last game that was sports based
No theme so it was very bland

Takeaway: Goal system was good, auto was good, lots of teamwork

Style:

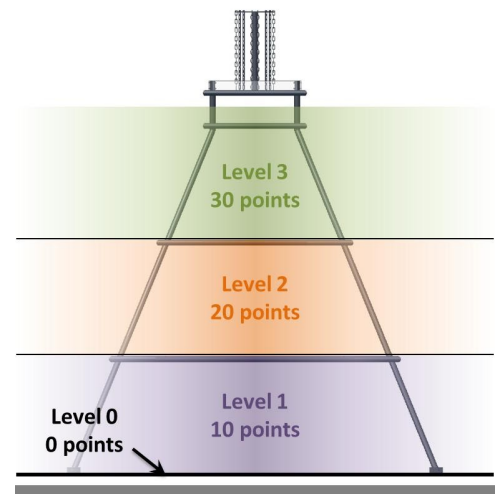# Ultimate Ascent

2013

GAME ELEMENTS:

1. Goals
   - What worked
     - Well placed retro-reflective tape made auto easy for teams familiar with vision processing
   - What didn't
     -

Notes:

2. Climb
   - What worked
     - Allowed for numerous solutions to climb
   - What didn't
     - Pushed teams to make a purely climbing robot; **made classed robots**

Notes:

3. Frisbees
   - What worked
     - Interesting shapes and flights
   - What didn't
     - Frisbees were too predictable; could fire from across the field and score perfectly(and you were protected)
     - Point system super unbalanced

Notes:

GAME STRATEGY:
One way that worked well and everything else was okay

GAME DESIGN:
No theme so it was very bland, again sports based

Takeaway: Reuse climb, don't use frisbees.

Additional notes

- Make sure the game is good for new and veteran teams
- Make it so the game includes teamwork, but allows for robots to independently score as well
- Incorporate well-balanced points
- Make a theme
- Climb
- Allow for different strategies
- Easy to use; hard to break
- Let teams diversify their scoring, strategies, and design.
- Make everything for everyone (even rookies can make a design, used in every match)