



## The Compass Alliance Pathways: Strategy

As with all sports, understanding the game is critical to success. Every year in FRC, a new game is released, with different tasks, point systems, and game pieces. On Kickoff, teams will read through the game manual and start devising their play strategy based on the point scoring rules. Teams will then design mechanisms to handle specific game pieces and tasks, and develop their robot to follow their game strategy. Most games will have multiple tasks to score points, and may include different points for tasks completed in the autonomous period, or during the endgame period.

Here are several resources that dive deep into the topics and ideas presented below. You can either read over the main concepts below, or dive straight into any of the following presentations.

1. [125 Game Analysis](#)
2. [1114 Game Analysis](#)
3. [254 Game Analysis](#)
4. [1678 Strategic Design Video](#)
5. [1678 Strategic Design Presentation](#)

### Level 0: Stepping Stones

1. Determine what the overall goals of your robot and strategy will be. Are you looking to excel at a specific task? Or will your robot be a jack of all trades, able to assist and perform in all aspects of the game? Is your goal to seed as high as possible after qualifications and earn as many ranking points as possible? These are some questions your team should be asking before and at Kickoff in order to lay a foundation and pathway for your build and competition season and the development of your game strategy. It is essential to organize a team-wide Kickoff event/meeting that allows your team enough time to discuss these points.
2. Make sure everyone on your robotics team is familiar with the current season's game manual. In order for your team to work effectively, it is important that all members understand the game and the rules. Team 1678 ensures this by making a rules test every year, the day of Kickoff.
  - a. The 2018 game manual can be found [here](#).
  - b. 1678's POWER UP rules test can be found [here](#).
3. Understand how competitions are run including how the ranking systems work in qualification matches and how elimination rounds are run. Knowing how competitions work is key to developing game strategy. Learn about competition rules in the current season's game manual.





4. Understand tasks and points within the game. Keep track of all the different methods that can be used to score points (as well as defend the opposing alliance from scoring, often called "de-scoring"). Also keep in mind the "bonus" points: more difficult tasks that award additional ranking points (RP) or extra match points, as well as any "coopertition" points to help your team in the overall standings, outside of the individual match (e.g. In 2016, if an alliance "broke" the outer walls, each team would receive 1 additional Ranking Point, therefore, a win could be worth 3 RP, instead of 2).
5. Look for core point cycles. Most games will have a task that will be repeated multiple times, and gain some amount of points for each cycle. Identify each step in this cycle, and attempt to make realistic predictions for how many cycles would be possible during the game time (e.g. In 2018, robots would travel to the alliance portal, retrieve a power cube, and score on the opponent's switch repeatedly).
6. Look for point ceilings. Several tasks can be completed only a certain number of times, or earn a certain number of points. While these may provide a large portion of points, eventually there will be no more use in performing these tasks. (e.g. 2017, once an alliance gathered 12 gears, there were no additional slots on which to place gears, so no more points could be gained from gathering gears.)

### Level 1: Venturing Onwards

1. Autonomous tasks are usually worth more points. As you look at the common tasks that you believe will be strategically advantageous, see if this same task can be completed in autonomous for a higher point reward. Most games will also contain smaller point rewards for simple tasks, such as driving the robot forward, or moving a pre-loaded game piece.
2. Most games will have an "endgame" challenge, something to be completed only once towards the end of the match for a larger point reward. Often, this will require the robot to climb, hang, or move to a specified zone on the field.
3. Keep penalty points in mind. Oftentimes, penalties are assigned for aggressive or damaging robot behaviour, and award the opposing alliance some amount of extra points based on the penalty. Additionally, games will often have penalties for exceeding limits of game pieces that can be held or maneuvered at a time. If a game piece gets caught in a mechanism, or stuck in your robot, is it better to keep playing and get minor penalties for handling a new game piece, or is there something else you can be doing?
4. Try many different permutations of point cycles, tasks, autonomous, and endgame points to get a feel for how the point system will work given different strategies. Once you have created a solid strategy, now is the time to start thinking about the actual mechanisms and robot design to complete the tasks outlined in your strategy.





5. Design should be driven by strategic goals, and strategic goals should be driven by absolute values from your point scoring permutations. When prototyping, designing, and testing, results of your tests should be compared against hard data that was used to create your game strategy (e.g. In 2017, an alliance could gain 1 ranking point by scoring 40 points from the boiler. Each ball scored was worth 1/3 of a point. Therefore, for a single robot to gain this RP, the mechanism must be able to score 120 balls in the 120 seconds of game time. The two independent variables to test against for this design were: how many balls per second can the mechanism shoot, and at what approximate accuracy? This design requirement was derived using the points defined by the game manual).
6. As your team develops a detailed and solidified strategy during build season, make sure to communicate with anyone working on the robot (mechanical-, electrical-, and programming-wise) and be on the same page with them. It is essential that your robot and your game strategy are developed alongside each other and constantly iterated and improved upon. Your robot should be able to complete the tasks outlined in your strategy, allowing for flexibility and ensuring effectiveness at competition.

## Level 2: Forging New Paths

1. Plan your strategy as an evolving concept, as you will iterate on your robot and gain more experience at competitions. Gameplay will look different in week 1 and 2 competitions compared to week 5 and 6 competitions. By the world championships, the number of cycles and points achieved by alliances will be much higher than the first competitions. As you strategize, you should assign priorities to given tasks that will provide the best scores for the appropriate level of competition.
2. If your team performs scouting, use the data that your scouting provides to make strategic decisions during competition. Scouting data can help to plan strategies for matches. If you seed in the top 8 after qualification matches, data can also help to form a pick priority list for use during alliance selection.
  - a. The Compass Alliance Scouting Pathway, which explains much more in-depth about scouting and its purposes and contains many more useful resources, can be found [here](#).
3. Check the [Chief Delphi forum](#) frequently. During the season, it can provide useful tips and in-depth analyses of the game as competitions are being played out. Students and mentors within the FRC community contribute to these forums in a professional manner.
4. Here are additional resources that are related to understanding gameplay and strategy.
  - a. [1114 Match Strategy](#)





b. The following 2 matches are great examples of understanding gameplay, scoring, and effective alliance partnerships. This is the “end goal” of creating a solid strategy and implementing a robot.

i. [Michigan 2013](#)

ii. [St. Louis 2014](#)





## Appendix A - Revision History

Revision #	Revision Date	Revision Notes
1.0	Jan. 2018	Initial Release
2.0	Sept. 2018	Updated formatting Added revision history

