

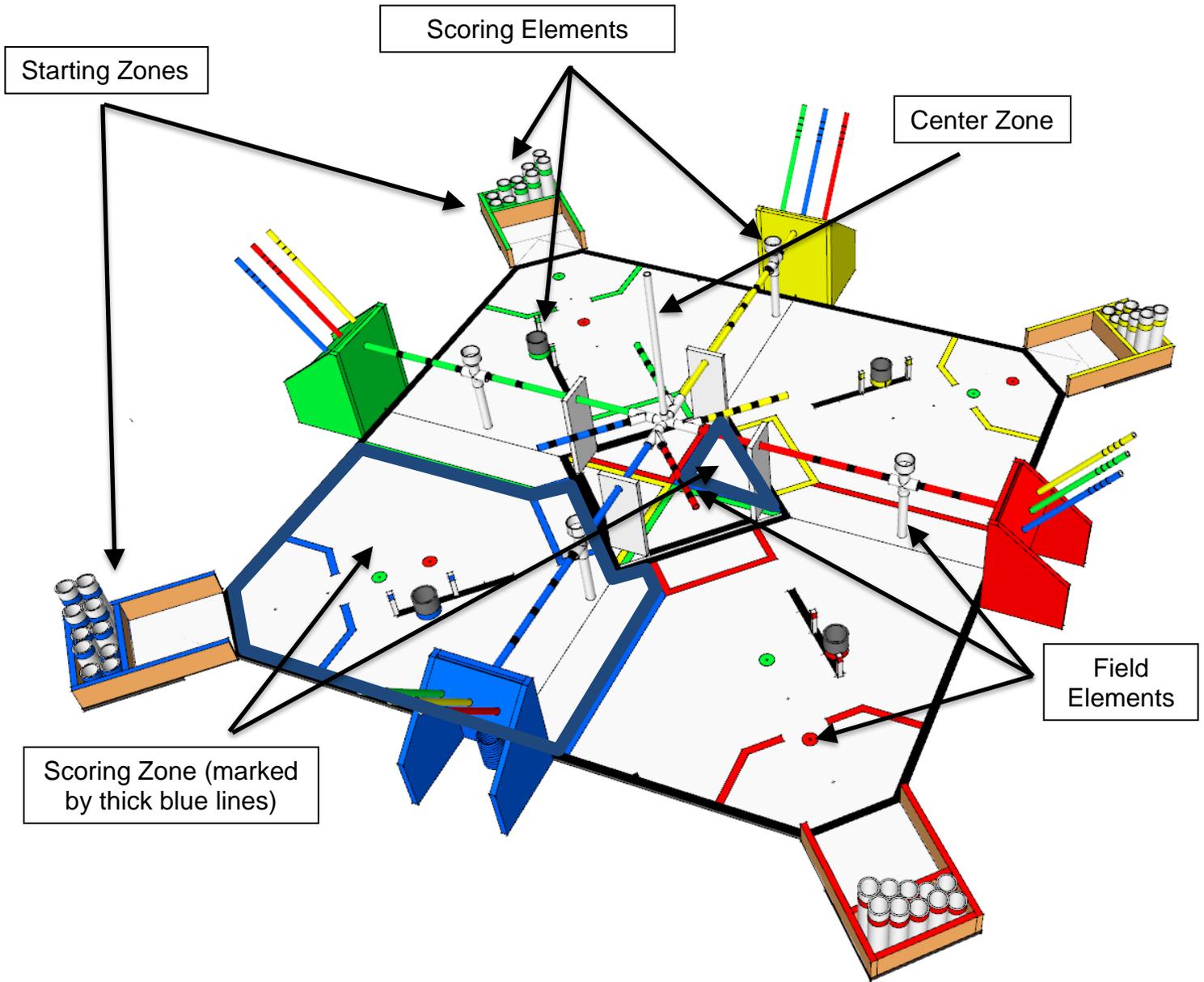


**GICAA Robotics
Spring 2018**

Scoring Summary

V1.03	3/9/2018		Release for Kickoff

Playing Field Summary



Terminology and Definitions

Game Rules: Rules that refer specifically to this season's game and playing field.

Playing Field: Defines the full range of the field mat, playing area, start zones, and any other areas deemed important to the game.

Floor: The field mat and any additional pads sit on the floor. The floor is considered out of play, unless otherwise noted in the game rules.

Starting Zone: Whenever a robot is restarted (at the beginning or during a round), the robot must start from its designated starting zone (by color). Each starting zone's size and location is defined by that year's game rules.

Scoring Zone: Any area designated in the play area where the robot can score points, either using scoring elements or the robot itself.

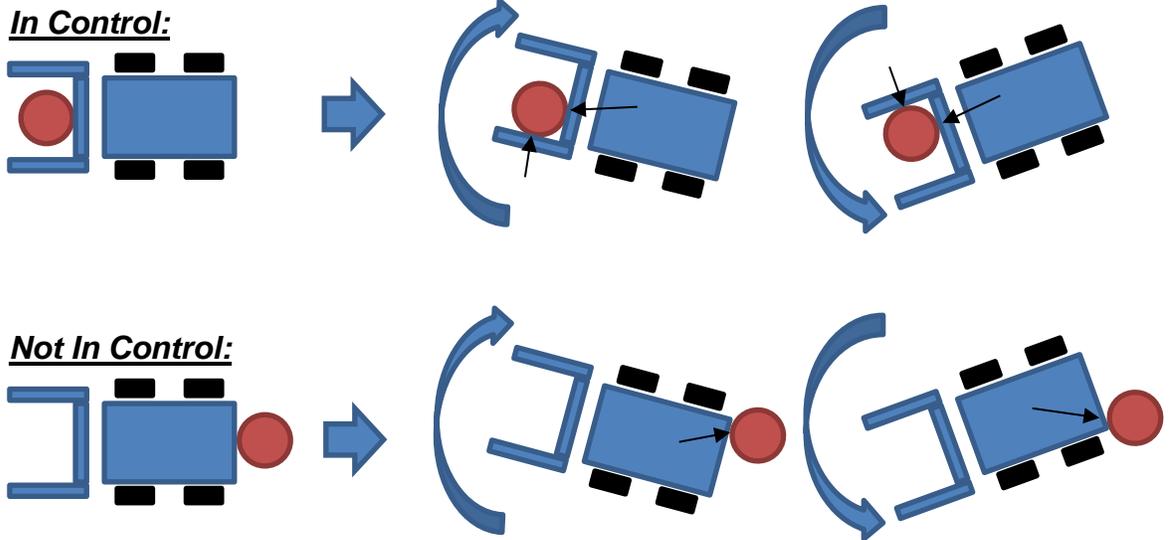
Scoring Elements: Any object designated by the game rules that will score points when placed in scoring zones by the robot.

Field Elements: Objects in the play area that the robot may interact with.

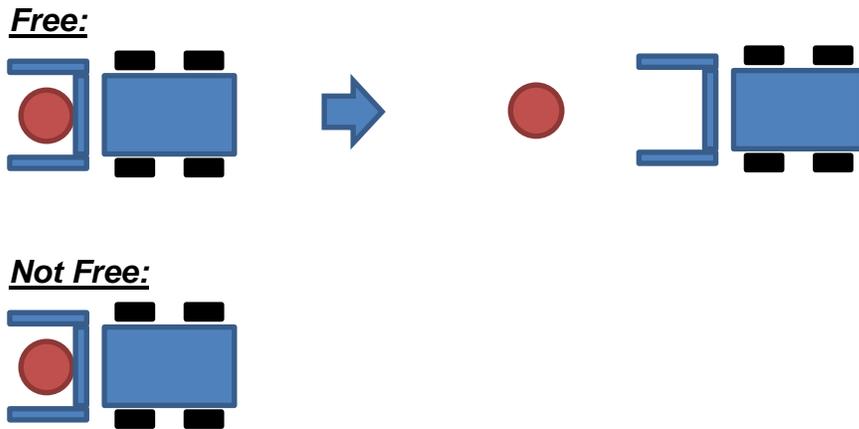
In Play: Refers to the state of the robot, scoring elements, or field elements, relative to the field. A robot is considered "in play" when none of its wheels / treads are in contact with the floor. An element is considered "in play" when it has no contact with the floor. While "in play", a robot or element may not be retrieved, except as permitted by the game rules.

Out of Play: Opposite of "in play". If a robot is not "in play", it is considered "out of play". A robot that is "out of play" may immediately be retrieved by its team and restarted from its start zone. Any scoring element UNDER CONTROL of the robot can also be retrieved, even if the element is not yet considered "out of play". An element may be retrieved when it is "out of play" (such as, rolls of the mat and touches the floor).

In Control: Refers to the state of scoring element, relative to the robot moving it. A scoring element is considered under “control” of the robot if the robot can be turned 90° in either direction and with each turn, the scoring element touches the robot on two points. For example:



Free: Refers to the state of a scoring element, in relation to a robot. A scoring element is considered “free” if the robot can be moved in any single direction in the X-Y axis (not up) and the scoring element does not move with the robot. For example:



General Match Rules

1. Each match is made up of three 60 seconds rounds. At the end of the first and second rounds, the field is reset per the game rules and robots are returned to their starting zones. At the end of the third round, points are calculated per the game rules, and ranking points are awarded. Ranking points are the sum of the team's position points (points scored based on what place the team finished) and total match points (match points by all four teams). For example:
 - a. Red: 265 pts – 4000 (1st place) + 810 (265 + 215 + 185 + 145) = 4810 ranking points
 - b. Blue: 215 pts – 3000 (2nd place) + 810 = 3810 ranking points
 - c. Green: 185 pts – 2000 (3rd place) + 810 = 2810 ranking points
 - d. Yellow: 145 pts – 1000 (4th place) + 810 = 1810 ranking points
2. During the 60 seconds round, robots may be restarted from their start zone each time they leave the playing field – “out of play”, either on their own, or by request from their referee. At the end of 60 seconds, robots are stopped (if necessary) and are returned to their teams. Any scoring elements that are “free” when the robot is removed from the field remain in the field and are handled as determined by the game rules. Any pieces that are not “free” are returned to the team with their robot.
3. Every time a robot is started from the team's start zone, the robot (and all loaded scoring elements) must completely fit within the start zone box and must not touch the black play area perimeter. While in the starting box, robots may be modified with attachments, so long as the result fits within dimensions outlined in that year's game rules. It may also be loaded with scoring elements, as detailed in the game rules.
4. Students are not permitted to enter or touch any element (or robot) considered “in play” at any time for any reason. If they need to have some interaction with the field or its elements, they must request the referee to assist them.
5. If a scoring element is pushed out of the play area during a round, it may be immediately retrieved and returned to the team's start zone.
6. Teams start each match with a number of “Rescue tokens”, as determined by the game rules. If students wish to retrieve a robot (for any reason) while it is considered “in play”, they may request to have their robot retrieved by raising their rescue flag. If the robot is not in contact with another robot, they must pay a token to the referee and ask the referee to retrieve their robot. If a team runs out of tokens, they may no longer request that their robot be retrieved while in play. Single exception: A team may choose to end a round early by informing the referee that they are finished for a particular round and they wish their robot to be retrieved. They do not need to spend a

token to do this. If a team retrieves their robot in such manner, they must place their robot in their starting area and may not restart the robot during that round.

7. ***Entanglement:*** If two (or more) robots contact each other, each team may request that their robot be return by raising their flag. Referees will retrieve their robots at no penalty. Any “free” piece is left on the field; any piece that is not “free” is returned to the team for their reuse. If a team chooses not to retrieve their robot after all of the other entangled robots have been retrieved, that robot may only be retrieved after paying a token penalty
8. Unless otherwise noted in game rules, scoring elements in the play area can be pushed, moved (by your or another team’s robot), and potentially de-scored. A scoring element that is pushed out of the play area can be immediately retrieved by the owner’s team. That scoring element is available for immediate reuse.
9. Any desired programming changes during the competition period must be done away from the field using the USB tether and only while the team is not currently competing.
10. If there is a tie in match points at the end of round three, a tie-breaker mechanism will be applied as per the game rules. One additional point will be added to the match point total of the team who broke the tie.
11. At the conclusion of match play, the top eight teams (by ranking points) in each division will compete in a single elimination tournament. The top two teams from each quarter-finals match will advance to the finals.

Game Scoring Summary – “Placed Invaders”

This year, teams will be invading other scoring zones by placing their scoring tubes into the playing areas of other teams, competing to see which team can score the greatest height of tubes in each zone. A special scoring zone in the center is reserved for those who can rise to a higher plane, granting double points for the scoring elements left there. Additional points can be obtained by capturing the multiplier ring and cap bonuses from the field and shrewdly placing them in locations offering the most advantage. Finally, teams are rewarded with bonus points for wisely using their rescue tokens, playing sound defense, and obtaining the clock bonuses available. The team that can balance efficient robot design, sound strategy, and good decision-making under pressure will emerge triumphant!

Starting Elements / Conditions:

SE01: Teams will start with 10 2” PVC tubes, (2) 10” long, (2) 8” long, (3) 6” long, (3) 4” long

SE02: Teams will start with (12) 3” rings (for scoring on the center scoring zone)

SE03: Teams will start with (3) rescue tokens

SE04: Robots are limited to 12”W X 12”L X 16”H

Clarification / Exceptions to General Match Rules:

GREX01: GM6 refers to the robot rescue process. If a robot is rescued in another team’s player area (if a robot’s wheel has crossed into the area), the rescue token is paid to that team (not the referee).

GREX02: GM6 says that a robot can be retrieved at any time. Robots may not be retrieved once they are ENTIRELY on the platform.

GREX03: GM7 refers to entanglement. Robots are permitted to be in contact on the platform and may not be retrieved. If a robot leaves the platform (a wheel touches the mat), it may then be retrieved.

GREX04: GM3 refers to allowable dimensions of the robot. If the robot has an attachment that expands its length / width dimensions, it must also be able to automatically retract the attachment. For instance, a robot can’t have an arm that simply falls down and cannot be pulled back up with a motor.

Penalties

PN01: Teams will pay a penalty of 2 tokens if they enter (a wheel COMPLETELY crosses) another team’s protected area (the area bound by colored tape immediately in front of start zone) or disturb that team’s multiplier ring / flags.

PN02: Teams may not make solely defensive actions in another team's playing area. Any affected scoring tubes will be righted during the field reset period

Field Scoring / Reset Order:

1. Perform Game Scoring Method 3 (Give bonus tokens to teams stopped in the Center Areas)
2. Return robots to teams, leave FREE scoring elements)
3. Perform Game Scoring Method 1B (Score tubes in Player Zones – Raised Platform)
4. Perform Game Scoring Method 1A (Score tubes in Player Zones)
5. Return any unscored tubes to teams
6. Perform Game Scoring Method 2 (Convert tubes to rings in Center Zone)
7. Place any captured tubes in the team's captured tube area
8. Reset any multiplier rings / caps that have not be scored.
9. Reset bonus flags if knocked over by opponents

GSM01-A: Scoring tubes in player zones – Mat (refer to place points table)

Each team starts the match with the same distribution of 2" scoring tubes. At any time during a round while the robot is stopped inside the start zone, teams may place as many scoring tubes on or next to the robot as they wish, if the robot plus tubes fit within the 12" X 12" start zone area. **HS: Tubes may ONLY be placed on the robot to be carried out of the start zone – NOT pushed!**

Robots will score the tubes by moving / carrying / pushing them any scoring zone, except for their own. At the end of a round, all team's robots and any tubes of their own color in their playing area are returned to their start zone. Any non-free scoring elements are returned to the team with the robot. Any FALLEN tubes on the center platform are returned to their respective teams. Any FALLEN tubes ENTIRELY within a team's play area are moved to an available space in that team's jail area. Any remaining tubes are then attempted to be moved to the corresponding scoring rod in that team's playing area. Referees will move up to TWO scoring tubes per color from each scoring zone to the matching scoring rod in that scoring zone. If there are more than two tubes of a color in a zone, tubes will be moved to that team's scoring rod, from shortest tube to tallest tube. Any remaining tubes are returned to their respective team.

At the end of the match, each zone scores 1st, 2nd, 3rd place, based on the height of the scoring tubes and the number of teams that score in the zone, per the following table:

	1 team	2 teams	3 teams
1 st place	25 pts	35 pts	40 pts
2 nd place	-	20 pts	25 pts
3 rd place	-	-	15 pts

The total height of the rods is determined by the value of the tubes, not the actual height (due to potential field and scoring element discrepancies).

Ties are broken first by the multiplier ring, followed by the lowest tallest tube. In the case of an exact replica, both score the tied position's score.

De-scoring – YES: Scoring tubes of other teams can be knocked over / pushed by other robots during the one-minute round. After the tubes have been moved to the scoring rods, they may not be de-scored.

GSM01-B: Scoring tubes in player areas - Raised Platform

Tubes in player areas on the raised platform are treated and scored differently than the main playing area, as follows:

1. Tubes here are scored before tubes in the player areas, and do NOT count against the two-tube limit scored in the player zones on the mat.
2. Only one tube per round is scored from the player area. If a player has multiple tubes in this area at the end of the round, the tallest tube is selected to score. If there is a tie, the tube that scores on the rod with the current lowest height of tubes is chosen.
3. If a tube is touching multiple colors (not counting their own color), the tube is scored on the rod with current lowest height. If there is a tie, place the tube in the tied zone clockwise from the start zone.
4. If a tube is FALLEN or completely in its color area, it is returned to its team – tubes are not captured on the raised platform.

De-scoring – YES: Scoring tubes may be pushed off the platform or knocked over by other teams.

Height limitation (applies to both GSM01-A & B) - Tubes may only be placed on the scoring rod if there is room remaining on the rod, which is indicated by the numbers at the top of the rod. If the number corresponding to the height of the tube attempting to be scored is visible on the rod, it is permitted to be scored. If the number is not visible, it is not considered scoreable and returned to the team. In this manner, it is possible to score higher than the height of the scoring rod.

GSM02: Scoring tubes in center zone (place points table + 3 pts / ring)

During each round, teams can score into the center scoring zone by hanging a tube on their team's colored rod extending into their play area. At the end of each round, after robots have been returned to teams, tubes are scored. A tube that is partially supported by that team's robot is considered NOT FREE and returned to the team with the robot at the end of the round.

A tube is scored by counting the number of black tape lines the tube is completely or partially covering. For each line touched in this manner, one of the 12 rings allocated to the team at the beginning of the match are placed on the center vertical rod. At the end of the match, teams score 1st, 2nd, 3rd, or 4th place points, based on the number of rings scored per team, per the following table:

	1 team	2 teams	3 teams	4 teams
1 st place	25 pts	30 pts	35 pts	40 pts
2 nd place	-	20 pts	25 pts	30 pts
3 rd place	-	-	15 pts	20 pts
4 th place				10 pts

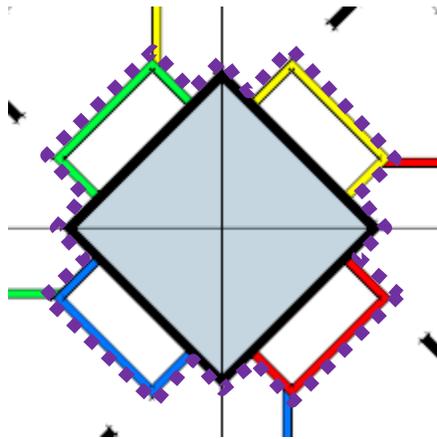
In addition to these points, teams will score 3 pts per ring at the end of the match. Lastly, the tube used to score the center zone is returned to the mat at the end of the black line (rounds 1 and 2 only). The tube can be retrieved by the team in a later round (if pushed by a robot out of the play area), or it will be returned during the field reset at the end of the following round.

The multiplier bonus or cap bonus cannot be used for this scoring zone.

De-scoring – NO*: Hung tubes CANNOT be de-scored by another team. If another team DISTURBS a hung tube after it is FREE from the scoring robot, it will be replaced by a referee such that it scores a maximum number of rings. However, a tube must be completely FREE of a robot to be considered scored. If a robot is requested to be retrieved (either voluntarily or due to contact) and the tube is still in contact with the robot, it is NOT scored and returned to the team with the robot.

*A team CAN de-score its own tube, including involuntarily (such as, being pushed into the tube by another robot).

GSM03: Ending the game stopped in the center area (1, 2, or 3 tokens)



If a team can be completely stopped inside the center area in any one of three locations, they will earn bonus tokens:

1. Lower area (colored tape): A robot that is touching the area bounded by colored tape (including the tape) earns 1 token.
2. At least one wheel on platform: A robot with at least one wheel off the playing mat and on to the platform gain 2 tokens
3. All wheels on platform: A robot completely off the mat and at least one wheel on the platform earn 3 tokens.

Robots must be COMPLETELY stopped by the end of round buzzer to earn this bonus. When a robot is completely stopped, the team's referee will indicate that the robot is eligible for the bonus by raising this hand.

De-scoring – YES: Robots can push each other off the raised platform and CANNOT be retrieved once ENTIRELY on the platform.

GSM04: Captured Pieces (3 pts per piece, 15 pts MAX)

Scoring tubes that are knocked over, IN PLAY, and completely inside the player area on the mat are considered CAPTURED during the field reset period after each round. Captured pieces are placed on the starting JAIL AREA mark. Additional pieces are placed immediately adjacent to the starting piece, on the left and right side.

Teams may ransom pieces at the end of round 1 and 2, at the cost of 1 token for 1 piece or 2 tokens for ALL their pieces. Teams may not ransom other team's pieces. Teams may not ransom pieces after the third round.

Pieces knocked OUT OF PLAY from the jail area during a round by a robot may be immediately retrieved by their team.

GSM05: Tokens (refer to table)

At the end of the match, teams will score points based on the number of tokens they have remaining, per the following table:

Tokens	Points
3	10 pts
5	20 pts
8	30 pts
12+	40 pts

GSB01: Multiplier Ring (place points X 2)

Each team had a designated multiplier ring, located on the black line parallel to their start zone. The starting position of the ring is determined at random at the beginning of each match (position 1, 2, or 3). Teams are awarded the multiplier ring if the robot can exit the playing field with the multiplier ring UNDER CONTROL. Once awarded, teams can score the multiplier ring by loading any scoring tube into the multiplier ring and pushing the two pieces together into another zone. If the scoring tube scores, the multiplier ring is also placed on that team's scoring rod AROUND any tubes that are on the rod (it does not add length to the tubes). At the end of the match, that team doubles the player zone score they are awarded. In addition, the multiplier ring act as first tie breaker.

After taking control of the multiplier ring, teams may save it to be used at a future time. If a multiplier is moved off it's starting position and not possessed by a team, it is reset to it's starting position during the field reset period.

De-scoring – NO: Robots can push each other off the raised platform and CANNOT be retrieved once ENTIRELY on the platform.

GSB02: Multiplier Ring – Flags (1 Flag: 10 pts, 2 Flags: 25 pts)

Each multiplier ring has two associated flags (marked for each team), located on the 4" marks before and after the multiplier ring. Teams will score bonus points for pushing the multiplier ring off the black line without knocking over the flags. Once the multiplier ring is off the black line, any upright flags are considered scored, even if they are knocked over in the continuation of pushing the multiplier ring. Flags are then immediately removed from the field.

De-scoring – NO: If the flags are knocked over by another team, the offending team pays a token penalty to that team and the flags are reset during the next field reset period. If the team

knocks over its own flags before pushing the ring off of the black line, they are removed for the match.

GSB03: Tip the Cap (20 pts + special scoring rod placement)

There are four tipping mechanisms in the playing area, one to the right and left of each team, each with a 2" PVC cap balanced on the top. Unlike the multiplier ring bonus, these caps are not designated for any team. To retrieve a cap, teams must first push the vertical trigger on the tipper mechanism to cause the cap to fall from its balanced position. Then, teams must catch the cap and drive it off the field. If a cap falls to the mat or is pushed out of bounds, the cap is replaced back on its tipper when the round is reset.

Special Note: There are four potential starting positions for each tipper. These positions, in addition to the tipper indicators in front of the start zones, will be determined and placed THE DAY OF THE MATCH. These positions will be fixed for the entire day.

A cap can score both an end of match bonus and a special placement ability. Once a cap is retrieved by a team, the cap will score a 20-pt. bonus, no matter if it is attached to a scoring tube. In addition, it can be fixed to an 8" or 10" tube to allow a special placement ability.

Special placement ability: If a tube with a cap is scored at the end of a round, the following additional steps are taken:

1. Any previously scored tubes (not multiplier ring) by that team CAN be returned to the team, for them to rescore elsewhere later
2. When the tube is placed on the rod, the tube is held at the top of the rod by the cap. At the end of the match, it scored the full height of the rod (17"). This makes it taller than 16" worth of tubes, but less than 18".
3. Tubes may be left under the capped tube or scored under a capped tube later. In this case, the capped tube must be eligible to be scored, determined by the height limitations defined in GSM01). This could potentially allow the cap to act a tie breaker. If it isn't eligible to be scored (or loses eligibility to be scored, if the tubes placed below it cause the tube with the cap to exceed the height limitation), it is returned to the scoring team.

De-scoring – NO: Once the cap is successfully retrieved, the team will score the bonus no matter if it is attached to a tube or if the tube it is attached to is scored.

Tie Breakers: At the end of the match, if two or more teams are tie, ties shall be broken (by adding a single point to the winner of the tie) using the following order:

1. Number of rings in center zone
2. Number of scored tubes in zone
3. Number of tokens
4. Rock / Paper / Scissors (best of 3)