FLY, CODE, CREATE

DRONE BATTLESHIP

AFTER SCHOOL PROGRAM

Objective

The game has many variations for multiple ages and ability levels, but its basis is much like the board game - to destroy all of your enemy's ships before they can locate and destroy yours. For this activity, teams will be expected to code their drone to the desired location and land.

Materials

• Parrot Mambo w/Grabber	1/Team
• Ipad	1/Team
• Foam Nerf Balls	1 Total
• Foam Tiles	16 Tiles
• Tape Measure (mark off distance from LaunchPad to Grid)	1 Total
• PolyDots	2 Total
• "Hit and miss" markers	Red and Blue Circular Cutouts
• Battleship player's cards	1 Set Per Team
• Pencil	2 Total

Directions

1. On the floor, set up your foam tile grid (16 tiles).
2. Cut out the fireball "hit" markers and the splash "miss" markers.
3. Divide students into teams.
4. The teams will strategize and decide where to mark their ships on their playing card (horizontally or vertically, but never diagonally).

DAY

2

ACTIVITY

1

TIME

60
Set-up: 10 min
Mission: 40 min
Wrap-up: 10 min
Event Duration: 20 min
Rotation Time: 2.5 min

APP

Swift Playground

CONNECTIONS

Technology: Integrated Thinking

VIDEO

TBA

HABITS OF MIND

Collaboration and Reasoning

DROBOTSCOMPANY
WHERE TECHNOLOGY MEETS FRESH AIR

5. They will then determine a "batting" order for their group.

6. Make sure to have player cards (and pencils) for both groups on which to mark their ships.

Welcome to Flight

On your handout, your team will "place" their 5 ships:

- Aircraft carrier (4 boxes)
- Battleship (3 boxes)
- Submarine (2 boxes)
- Destroyer (2 boxes)
- Patrol boat (1 box)

Color in the appropriate number of boxes for each ship.

- Ships may run vertically or horizontally, but never diagonally.
- Ships may touch, but may not intersect.

[To determine which group goes first, ask the teams: "When was the original game of Battleship created?" (1967)] - Whoever can come closest to the right year takes the honors]

Teams' Parrot drones will be coded to fly over the coordinate battle plane and drop a blaster ball into a square on your opponent's grid (taped on the floor).

Wrap Up Discussion

1. What method proved to be the most efficient for finding a ship?

2. When a ship was found, did your group try to sink it before moving onto the next target? Was this effective for the mission?

3. If coding was applied, how did team strategy change?

AFTER SCHOOL PROGRAM

DAY

2

ACTIVITY

1

TIME

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Swift Playground

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WHERE TECHNOLOGY MEETS FRESH AIR

DRONE BATTLESHIP

Extensions (Expanding on Mission):

Option 1 (Older Groups - Coding)

Same as the variation for younger groups, but the drones must be coded from an identified starting location.

Have teams "call off" their shot prior to running their code (for example "B5").

Only those drones dropping a ball into their called square count as a direct hit.

Option 2 (Requires Fewer Materials and Less Time)

This can be conducted as a free flight mission to increase the opportunity and have the team member free fly during this exercise.

AFTER SCHOOL PROGRAM

DAY

2

ACTIVITY

1

TIME

60
Set-up: 10 min
Mission: 40 min
Wrap-up: 10 min
Event Duration: 20 min
Rotation Time: 2.5 min

APP

Swift Playground

CONNECTIONS

Technology: Integrated Thinking

VIDEO

TBA

HABITS OF MIND

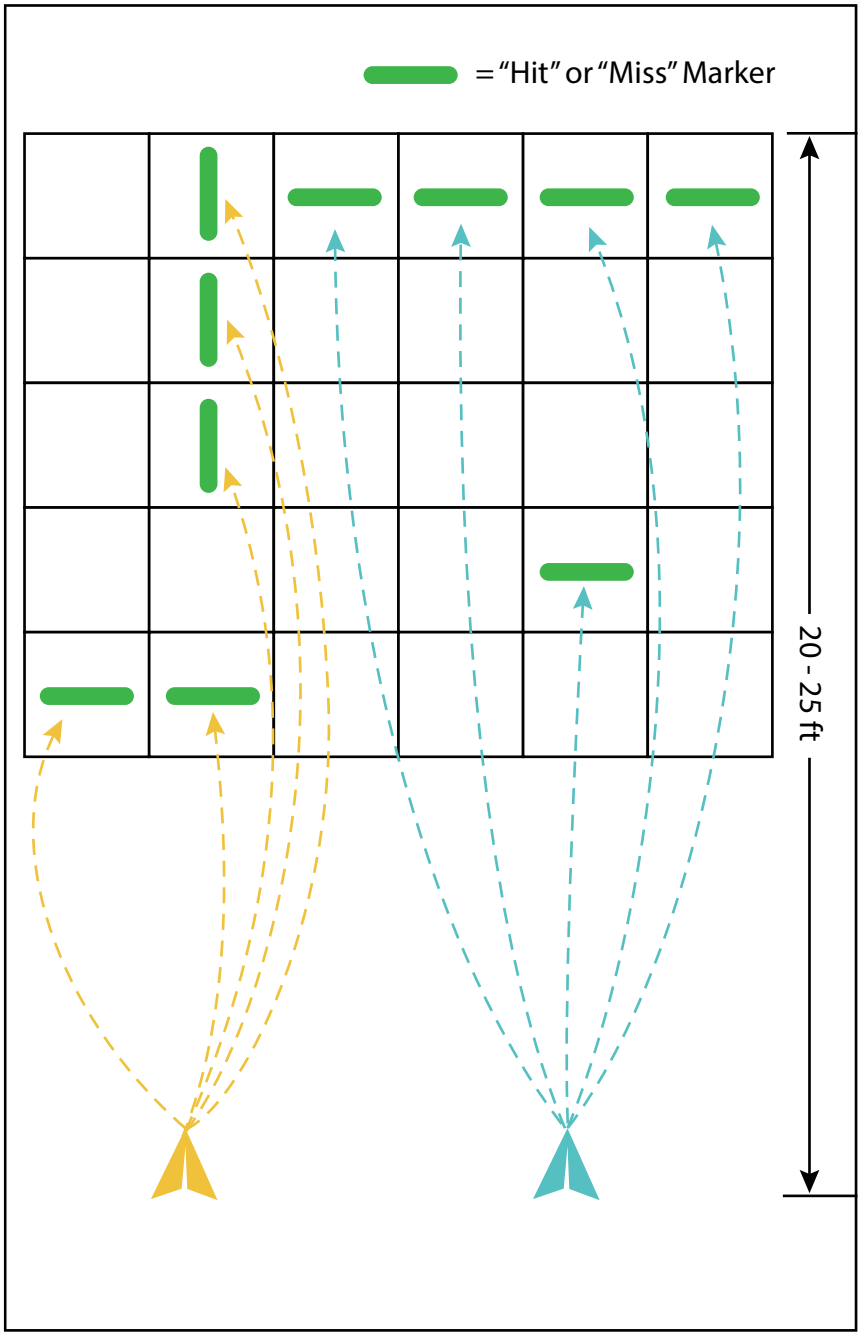
Collaboration and Reasoning

FLY, CODE, CREATE

DRONE BATTLESHIP

AFTER SCHOOL PROGRAM

Flight



ICON LEGEND

- Team #1
- Team #2
- Foam Tile (Quantity)
- Polydot
- Racing Hoop
- Racing Arch
- Agility Cone
- Orange Obstacle
- Tower of Doom
- Plastic Cups
- Balled-up Paper
- Cotton Balls
- Popsicle Sticks
- Figure

DROBOTSCOMPANY
WHERE TECHNOLOGY MEETS FRESH AIR

FLY, CODE, CREATE
CONNECT FOUR

Objective

Code your drone to land in a square, claiming it for your team. Command four squares in a row, or diagonally, to win the challenge.

Materials

• Parrot Mambo w/Grabber	1/Team
• iPad	1/Team
• Polydots	1/Team
• Foam Tiles	32 Total
• Nerf Balls	10 Total
• Yellow and Red Markers (Circle Cutouts)	8/Team

Directions

1. Using the polydots, mark off two separate launchpads that the teams will use as starting points (both must be equidistant from the foam tile grid).
2. Both starting points must be 2 meters from the grid and placed in a straight line from each corner.

Welcome to Flight

1. Gather in 2 drone teams - Red Team and Yellow Team.
2. The object of the game is to write a simple line of block code, taking off from the launchpad and landing on the Connect 4 game board.
3. Yellow Team and Red Team will alternate turns.

AFTER SCHOOL PROGRAM

DAY

1

ACTIVITY

1

TIME

60
Set-up: 10 min
Mission: 40 min
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Event Duration: 20 min
Rotation Time: 2.5 min

APP

Swift Playground

CONNECTIONS

Engineering: Coding

VIDEO

TBA

HABITS OF MIND

Academic Success through Cognition and Collaboration

DROBOTSCOMPANY
WHERE TECHNOLOGY MEETS FRESH AIR

CONNECT FOUR

4. When a drone lands on a square, the team that flew the drone may claim, with their color marker, the square that lies under the front right "foot" of their drone, unless that square has already been claimed by the opposing team.
5. If that square has already been claimed, the team may not leave their marker, and the game continues with the next player team from the opposing team taking their turn.
6. Squares do not have to be claimed in consecutive order like the original gravity-bound game.
7. Drones may land on and claim any available square.
8. The first team to claim 4 squares in a row - vertically, horizontally, or diagonally - wins.

Wrap Up Discussions

1. What kind of strategy was discussed before the start of the game? How would you change knowing now how the game played out?
2. Were there any unforeseen challenges coding the drone?

Extensions (Expanding on Mission):

This can be conducted as a free flight exercise, which calls for the same scope within the exercise.

AFTER SCHOOL PROGRAM

DAY

1

ACTIVITY

1

TIME

60
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Swift Playground

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HABITS OF MIND

Academic Success through Cognition and Collaboration

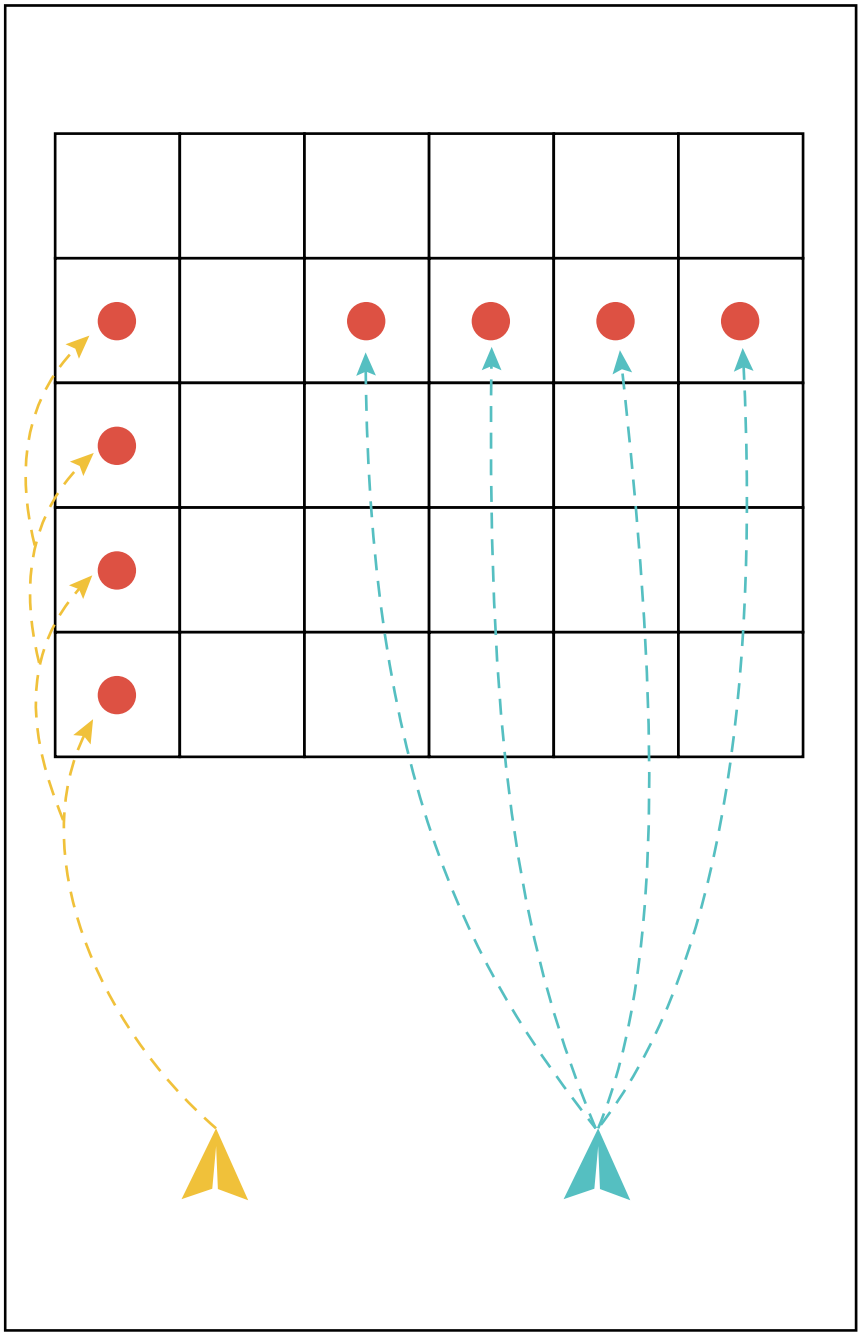
DROBOTSCOMPANY
WHERE TECHNOLOGY MEETS FRESH AIR

FLY, CODE, CREATE

CONNECT FOUR

AFTER SCHOOL PROGRAM

Flight



ICON LEGEND

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- Cotton Balls
- Popsicle Sticks
- Figure

DROBOTSCOMPANY
WHERE TECHNOLOGY MEETS FRESH AIR

FLY, CODE, CREATE
SURGICAL DROBOTS

Objective

Starting from the pan of operating tools, your team must code the doctor drone over to the patient and deposit the donor organ into the correct body opening. Only one organ may be transplanted into each cup. You are not docked points for a dropped organ. This is a timed event, and the team who deposits organs the quickest wins. Your instructor will hand each team a flashcard that denotes the order in which you will deliver the organs.

Materials

• Parrot Mambo w/Grabber	1/Team
• Ipad	1/Team
• PolyDots	1/Team
• Plastic Cups	6/Team
• Hoop/Arch Kit	1/Team
• Organ Clipart (optional)(Heart/ Kidney/Liver/Arteries)	1/Team
• Organ Delivery Flash Cards (order of delivery)	Instructor Reference
• Blue Painters Tape	1 Total
• Chalk	(1) - if conducted outside
• Nerf Balls (organs)	10/Team
• Stop Watch	1 Total

Background Information

"Paging Dr. Mambo, you are needed in the operating room STAT!" Our patient, Parker, is in desperate need of some precision flying to transplant several critical donated organs. No anesthesia? No problem! It's time to operate, Dr. Mambo style.

AFTER SCHOOL PROGRAM

DAY

7

ACTIVITY

1

TIME

60
Set-up: 10 min
Mission: 40 min
Wrap-up: 10 min
Event Duration: 20 min
Rotation Time: 2.5 min

APP

Swift Playgrounds

CONNECTIONS

Science: Health Education

VIDEO

TBA

HABITS OF MIND

Critical Thinking through Evaluation and Analysis

DROBOTSCOMPANY
WHERE TECHNOLOGY MEETS FRESH AIR

FLY, CODE, CREATE
SURGICAL DROBOTS

AFTER SCHOOL PROGRAM

Directions

1. Create a "patient" by taping off the silhouette of a body on the floor with the painter's tape.
2. Depending on the amount of time and the age of the pilots, you can also have students create their own patient bodies.
   If the mission is flown outdoors, chalk on a sidewalk or on a paved playground also works.
3. Place the 8-12 target cups on the body to indicate transplant locations. Cups may need to be taped down or have additional weight placed inside to keep them from blowing away.
4. Mark off a starting location (using polydots).
5. All drone flights must start from this location.
6. Unlike the board game, Operation, the object of this game is not to remove organs, but instead to deposit them.

Welcome to Flight

1. The mission commander, prior to the mission, will pass a flashcard to the teams, which will have a transplant order that they will use for the delivery.
2. This is a timed event, and the instructor must account for time during both team missions.
3. Have each team member conduct this exercise and record their time. (Total time will be added at the end of the mission to determine the overall mission winner.)
4. If they miss the cup or drop the organ into the wrong cup, the team will not receive credit to move onto the next transplant and must repeat the process until successful.

DAY

7

ACTIVITY

1

TIME

60
Set-up: 10 min
Mission: 40 min
Wrap-up: 10 min
Event Duration: 20 min
Rotation Time: 2.5 min

APP

Swift Playgrounds

CONNECTIONS

Science: Health Education

VIDEO

TBA

HABITS OF MIND

Critical Thinking through Evaluation and Analysis

DROBOTSCOMPANY
WHERE TECHNOLOGY MEETS FRESH AIR

FLY, CODE, CREATE
SURGICAL DROBOTS

Wrap Up Discussion

Discuss with the stuents the innovative uses of drones in the coming years as it pertains to surgical rooms. (There will be uses in the medical profession for drones when conducting surgical assessment).

Extensions (Expanding on Mission)

This mission can be adapted in many ways based on student ages and flying abilities. For younger pilots, they may drop an organ into any unfilled cup, receiving a point for each successful implant. This will be a free flight exercise, as opposed to coding the mission each time.

AFTER SCHOOL PROGRAM

DAY

7

ACTIVITY

1

TIME

60
Set-up: 10 min
Mission: 40 min
Wrap-up: 10 min
Event Duration: 20 min
Rotation Time: 2.5 min

APP

Swift Playgrounds

CONNECTIONS

Science: Health Education

VIDEO

TBA

HABITS OF MIND

Critical Thinking through Evaluation and Analysis

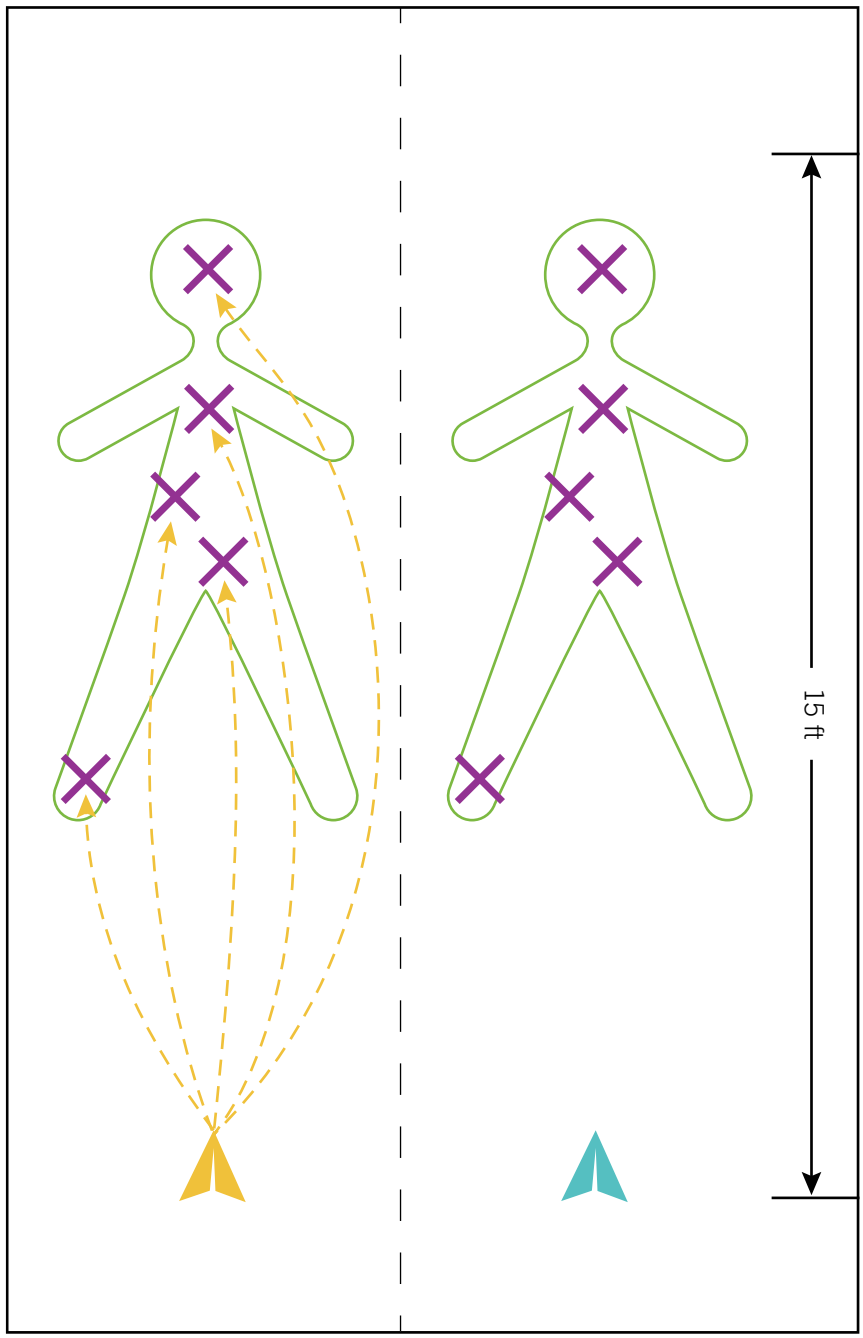
DROBOTSCOMPANY
WHERE TECHNOLOGY MEETS FRESH AIR

FLY, CODE, CREATE

SURGICAL DROBOTS

AFTER SCHOOL PROGRAM

Flight



ICON LEGEND

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- Figure

DROBOTSCOMPANY
WHERE TECHNOLOGY MEETS FRESH AIR

DRONE MISSION MANIA

INSECT INFESTATION

Objective

Teams will need to identify the bug-stricken rooms and debug by delivering the extermination solution (Nerf balls) to those rooms. This is a timed exercise, given the fact that the hotel is hosting a huge conference this weekend. Teams must properly identify and debug the rooms (which will be marked by clipart bugs), which can be done by coding Nerf balls to these rooms.

Materials

• Parrot Mambo w/Grabber	1/Team
• Ipad	1/Team
• Foam Tiles	18/Team - 36 Total
• PolyDots	1/Team
• Small Insect Figurines OR Clipart Cutouts	---
• Painters Tape (to construct hallway as a frame of reference)	1 Total
• Foam Nerf Balls	10/Team
• Stopwatch	2/Team

Background Information

You're a cleaning staff for a hotel chain. You just received a call that one of their locations has been infested with bed bugs. This can quickly become rampant. The hotel staff said they have already stripped the beds, but need you to come in and exterminate certain rooms within the hotel.

AFTER SCHOOL PROGRAM

DAY

14

ACTIVITY

1

TIME

60
Set-up: 10 min
Mission: 40 min
Wrap-up: 10 min
Event Duration: 20 min
Rotation Time: 2 min

APP

Free Flight Mini
Swift Playground

CONNECTIONS

Engineering: Coding

VIDEO

TBA

HABITS OF MIND

Links among Society and Science

DROBOTSCOMPANY
WHERE TECHNOLOGY MEETS FRESH AIR

DRONE MISSION MANIA

INSECT INFESTATION

Directions

1. Using the painter's tape, set up a 8ft lane as a format for the floor plan (representing the lane that the teams must fly down for each deposit).
2. Each room should be roughly 12in by 12in, and they don't necessarily have to be connected for the sake of this exercise. (A single foam tile will represent a single room. There should be 8 rooms down each lane and two rooms at the end of the hallway).
3. Using the clipart, have the opposing team who is not flying place 8 bugs in the rooms of their choice. Allow them to collaborate and strategize on where they want the infestation.
4. Establish a starting point for the teams with a single polydot.
5. This is a timed exercise, and teams are required to deliver a Nerf ball to each infested room, then must return to retrieve another Nerf ball.
6. Each pilot will deliver the solution to two rooms or more, but make sure all team members code the drone.
7. The team that is able to complete this task in the shortest amount of time wins the activity.
8. You have 40 minutes to conduct this exercise, so once the first competition occurs and a time is recorded, have the teams replace the insects and start a new event.

Brown bugs require one treatment and black bugs require two treatments. Of the eight bugs that are placed, 2 will be black and 6 will be Brown.

Total time at the end of the activity will determine the winner.

AFTER SCHOOL PROGRAM

DAY

14

ACTIVITY

1

TIME

60
Set-up: 10 min
Mission: 40 min
Wrap-up: 10 min
Event Duration: 20 min
Rotation Time: 2 min

APP

Free Flight Mini
Swift Playground

CONNECTIONS

Engineering: Coding

VIDEO

TBA

HABITS OF MIND

Links among Society and Science

DROBOTSCOMPANY
WHERE TECHNOLOGY MEETS FRESH AIR

INSECT INFESTATION

Wrap Up Discussion

1. For coding exercise, did the change in locations create additional collaboration and strategizing?
2. What practices made rewriting the coding more efficient?

Extensions (Expanding on Mission)

In the event that the teams are limited in time or are having trouble with the coding aspect of the exercise, have them free fly the exercise, but it is recommended that they at least attempt to successfully code to one of the cups.

AFTER SCHOOL PROGRAM

DAY

14

ACTIVITY

1

TIME

60
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Rotation Time: 2 min

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DRONE MISSION MANIA

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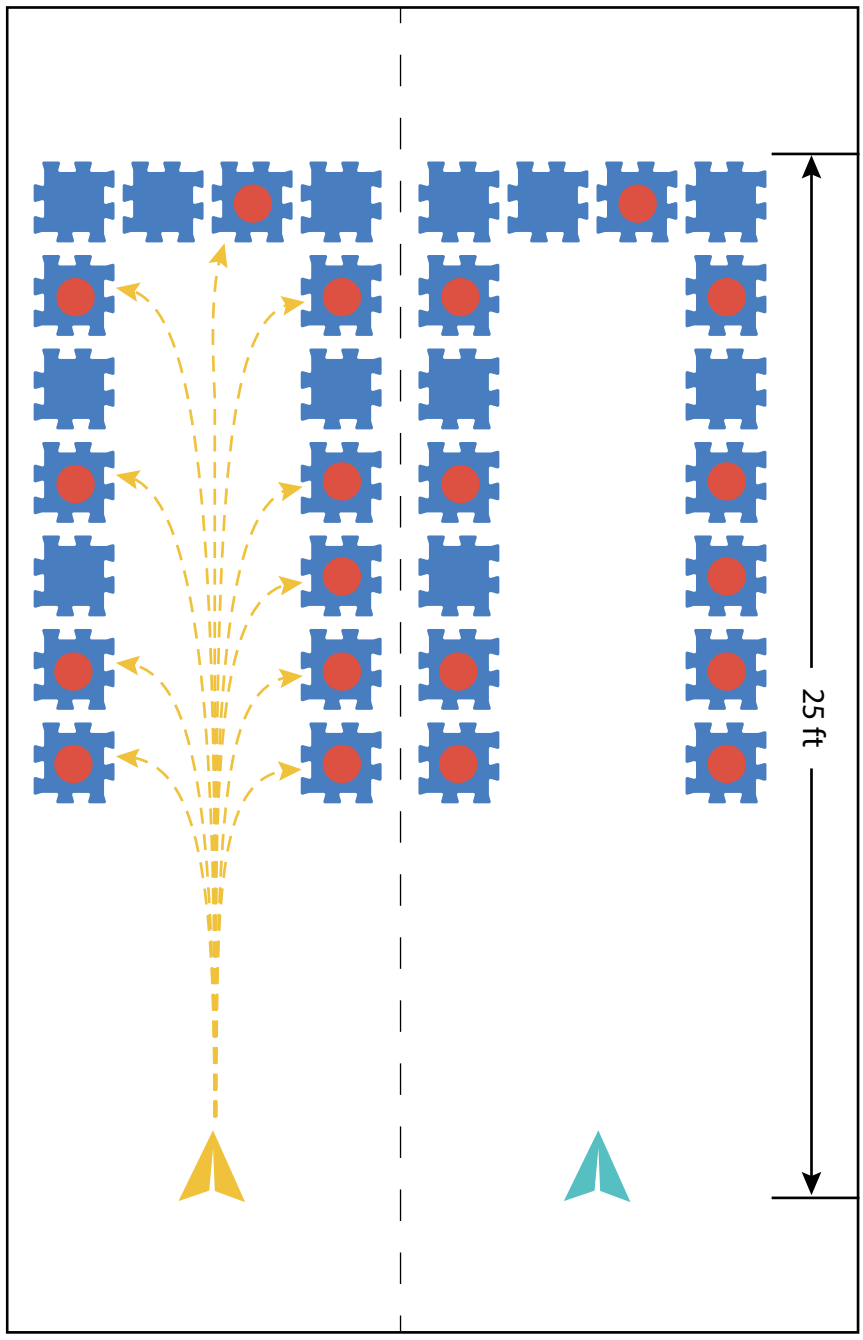
AFTER SCHOOL PROGRAM

Flight



ICON LEGEND

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