Coding with Parrot Mini Drones

Terminal Objective 3.2: Program the mini drone to fly through an obstacle course

Performance Objective 3.2: Using Tynker app, program the mini drone to fly through an obstacle course with precision.

Enabling Objectives:

1. Change values on movement blocks
2. Sketch program design (pseudocode)
3. Program flight pattern using Tynker
4. Troubleshoot program
5. Execute program to perform flight task

Materials and Supplies:

- Ipad with iOS 8.0 or later or Android tablet with 4.0 or later
- Download and install Tynker App on tablet (found in app store)
- Safety glasses for all participants
- Parrot Mini Drone: Cargo or Mamba
- USB charging device
- *Autonomous Challenge 3.2* (for each student)
- *Performance Assessment 3.2: Operation Delivery* (for each student)
- 3 Hoola-hoops, Tape, Foam mats

Learning Activities:

1. Video: ROAV mini 3.2 v1
2. Create flight plan in pseudocode
3. Practice programing using blocks in Tynker

Formative Assessment:

1. Safely perform flight with *Autonomous Challenge 3.2* activity

Summative Assessment:

1. Evaluate students using *Performance Assessment 3.2: Operation Delivery*

Supplemental teacher resources:

- Amazon prime air's first customer delivery https://www.youtube.com/watch?v=vNySOrI2Ny8
- A ride in google's self driving car https://www.youtube.com/watch?v=TsaES--OTzM

Autonomous Challenge 3.2:
Operation delivery

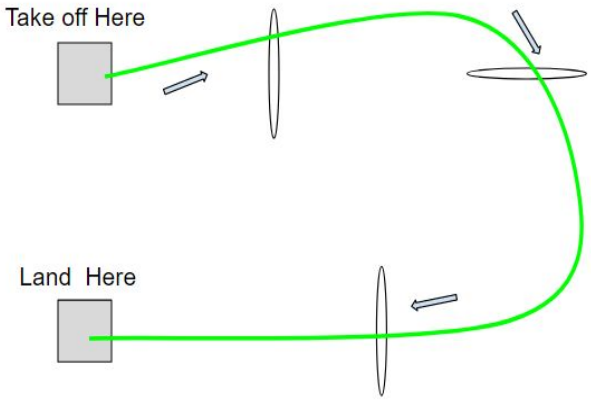
Name:_____ **Date:**_____

Situation

Amazon and other companies are working toward using drones to deliver orders to their customers. This type of drone system is complex and requires precision and accuracy. Choosing most efficient routes and avoiding obstacles is key for the success of this type of transport. Drone programer pilots need to be able to program these drones to follow paths in order to deliver packages safely.

Challenge

As a team of independent programmers, you have been asked to test early drone hardware and software to see if this can be achieved. The customer, Amazon is wanting these tests done before acquiring FAA approval. Your challenge is to program the mini drone to go through an obstacle course with precision and efficiency. The course will consist of the following layout set up in the gym. There will be a pad for takeoff and one for landing. The drone must take off and travel through three hula- hoops before landing. The challenge will be to get through the obstacles without crashing in the shortest amount of time.



1) Sketch your program here using pseudocode

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2) Program using Tynker. Your program will probably not work the first time. You will need to try out your program and make adjustments to achieve this goal. Make sure you document what changes you made.

Changes to program:

Criteria	**Much below Expectations** 1 Point	**Below Expectations** 2 points	**Meets expectations** 3 points	**Exceeds Expectations** 4 points
Avoids obstacles	Touched ground during flight	Hits more than one	Hits 1 object	No collisions
Follows flight path		Breaks path	Generally follows path	Maintains path
Accurate Landing		Down the street (Misses pad)	In the yard (Touching pad)	On the porch (Middle of pad)
Time(standard) **Set by Teacher**	15+ seconds	+10-14 seconds	+6-9 seconds	+1-5 seconds
Safety	Does not follow safety practices		Follows safety practices	
Total				

3) Reflection What was the hardest part of this challenge? What would you have done different?

Autonomous Challenge 3.2 (reference)

To set up this challenge you will need 3 hoops fixed in an upright position and two foam floor mats.

Steps:

1. Establish designated fly and safe zones in an open area
2. Set up challenge using hoops and mats.(see fig 1.1)
3. Have operating student place minidrone in the fly zone
4. Move to the safe zone
5. Have student test and troubleshoot code
6. Evaluate student's performance using *Performance Assessment 3.2: Operation Delivery*

Figure 1.1

Performance Assessment 3.2:
Operation delivery

Name:_____ **Date**_____

Terminal Objective 3.2: Program the minidrone to fly through an obstacle course

Performance Objective 3.2: Using Tynker, program the minidrone to fly through an obstacle with precision.

Assessment

Criteria	**Much below Expectations** 1 Point	**Below Expectations** 2 points	**Meets expectations** 3 points	**Exceeds Expectations** 4 points
Avoids obstacles	Touched ground during flight	Hits more than one	Hits 1 object	No collisions
Follows flight path		Breaks path	Generally follows path	Maintains path
Accurate Landing		Down the street (Misses pad)	In the yard (Touching pad)	On the porch (Middle of pad)
Time(standard) **Set by Teacher**	15+ seconds	+10-14 seconds	+6-9 seconds	+1-5 seconds
Safety	Does not follow safety practices		Follows safety practices	
Total				

Assessed by:_____ **Date:**_____