**Coding Drones**

Students will be able to:

1. Explain drone safety.
2. Define yaw, pitch, and roll.
3. Define “coding”, “programming”, and “debugging”
4. Identify key computer science vocabulary
5. Program drones to navigate a certain flight path.

Interest Approach

Today we are going to spend our time learning to code a drone. When you hear the term “code”, what does the term “code” mean to you?

Explain that in computer science, “code” means a set of instructions that a computer can understand. Let students know that today, they are going to practice “coding”, “programming”, and “debugging”.

Define:

**Coding** means to write code, or to write instructions for a computer.

**Programming**, similarly, means to write code or instructions. Today, you will program with blocks on the iPad to be executed by the drone.

**Debugging** means to check code for mistakes and try to fix errors.

Activity 1

Explain to the students there are two major types of programming languages

1. Visual programming language (drag and drop commands)
2. Text programming language (type out commands)

\*\*Visual programming language uses commands, just the text is “behind the scenes”

we will be using visual programming language today.

Open Tynker on iPads

Click on Dragon Spells

Click on Dragon Eggs

Click on Level 1

Choose a dragon egg to hatch

Complete the instructions for Level 1

Continue programming until you complete Level 8

Safety with drones

* Always fly below 400 feet.
* Always fly within visual line of sight.
* Be aware of airspace requirements.
* Never fly over groups of people.
* Never fly over stadiums and sports events.
* Never fly with 5 miles of an airport without contacting air traffic control and airport authorities.
* Never fly near emergency response efforts such as fires.
* Never fly near other aircraft.
* Never fly under the influence of drugs or alcohol.

Roll, Pitch, and Yaw

Imagine three lines running through a drone and intersecting at right angles at the drone’s center of gravity.

* Rotation around the front-to-back axis is called **roll**.
* Rotation around the side-to-side axis is called **pitch**.
* Rotation around the vertical axis is called **yaw**.

Activity 2

Now let’s program a drone to carry out commands

Click on Projects

Click on Create New Project

Click on Toys

Click on To the Sky

List of Commands

Take off

Land

Stop

Emergency

Is connected?

Set speed to 50%

Forward for 1 seconds

Backward for 1 seconds

Left for 1 seconds

Right for 1 seconds

Turn right by 90 degrees

Turn left by 90 degrees

Flip flip forward

Up for 1 seconds

Down for 1 seconds

Start moving up

Start moving down

Start rotating left

Start rotating right

Take picture

Fetch picture from drone

Delete picture on drone

Set \_\_\_ to number of pictures on drone

1. Program drone to take off and land.
2. Program drone to roll right, roll left, then land.
3. Program drone to yaw right, yaw left, and land.
4. Program drone to pitch forward, pitch backward, and land.

Activity 3

Program your drone to jump over buildings. (Use stacked up pizza boxes for buildings)

1. Take off, fly over the first building, land.
2. Fly over the second building and land.

Activity 4

Program drone to fly using the following flight path. You must land on each helipad.

1. Flight Path- Start Blue Green Orange Finish

Upon completion, move to second flight path.

1. Flight Path- Start Green Blue Orange Finish

Upon completion, move to second flight path.

1. Flight Path- Start Blue Orange Green Finish