

Berrien Springs Partnership Syllabus and Instructor Qualifications

CLASS TITLE: Drone Building

GRADE OR AGE LEVELS: Grades 5th & up

START DATE: contact instructor for class dates **END DATE:**

WEEKS TOTAL: 17 **WEEKS OFF:** 3

DAY/TIME REQUIRED: Wednesday 10-11am **ADD'L DAYS/WK AVAILABLE:**

HOURS (REQUIRED): 17 **# HOURS (OPTIONAL):** 73 (approx.)

TOTAL SEMESTER HOURS POSSIBLE: 90

LOCATION/ADDRESS: STEAMWORKS: 606 Carrol St, Suite B, Buchanan MI 49107

MAIN INSTRUCTOR: Rob Kerr

CONTACT INFORMATION:

phone: 269-362-5046

email: rob@funlearningcompany.com

website: <https://FunLearningCompany.com/>

ADDITIONAL REGISTRATION AT SITE REQUIRED? NO

MAIN INSTRUCTOR QUALIFICATIONS:

I am passionate about helping students to explore new things and express their creativity. I have been teaching myself for the last eight years. For the last six of those, I've been partnering with different schools through the Fun Learning Company to teach critical thinking and STEAM courses. I enjoy tinkering and making things myself, and seek to encourage the entrepreneurial spirit in others as well. I have published my own card game, as well as writing and producing an album. One of my favorite things is when I can combine multiple interests together, like when I wrote a ukulele song for my Drone Building students to help them remember yaw, pitch & roll. I love hearing about my students' interests and seeing how we can bring those into our classroom as well. I hope to continue learning from, and with, young people for years to come.

COURSE DESCRIPTION (complete overview shown on website):

Developing a scientific approach to problems, while learning terminology, problem-solving, and engineering principles through fun hands-on projects; gaining an in-depth understanding of the way UAVs have evolved over time, including how they're built, operated, and used today.

SYLLABUS/OUTLINE: weekly breakdown of Project-Based Learning activities

Weeks 1-7: learning about the basics of flight and flying some pre-built drones; testing out various drone designs using Flybrix Drone kits (including multiple types of quadcopters, an octocopter, and a hexcopter).

Weeks 8 & 9: design your own drone competition using the Flybrix Drone kits.

Weeks 10-14: Program CoDrone to complete various challenges using Blockly and Arduino

Week 15: Build your CoDrone remote and program it to control CoDrone

Weeks 16 & 17: Flying and maneuvering through obstacles + completing challenges with your drones.

COURSE OBJECTIVES AND APPROXIMATE TARGET DATES:

After 6 weeks, the students should have a basic understanding of drones, including their uses, various frames and how they impact flight, and basic flight principles. This includes:

- Pros and cons of various airframe designs – comparing hex frame, quad frame, and octo frame, shorter/longer wings, bent wings, etc. (considerations include battery life, speed, stability, etc)
- Hypothesizing about, and testing, the outcomes of various physical modifications to drones.
- Engineering concepts such as: air resistance, inertia, torque, pivot points, aerodynamics, etc.

By 12 weeks, students should have an introduction to programming their CoDrone in Blockly, and understand + be able to explain some programming concepts, like:

- Loops
- Functions
- Events / Event Listeners

At the end of the semester, students should also understand basic programming in Arduino and feel confident in their ability to fly a drone.

In the second semester, students will focus on four primary goals:

1. Understanding the individual components that make up larger drones, including how to choose the appropriate components and how to ensure they will work together.
2. The ability to solder simple-moderate circuits (including debugging soldering issues/mistakes).
3. Knowledge on the classification, history, and uses of drones and other UAVs, as well as FAA regulations on drone flight + registration and requirements for obtaining a drone pilot license.
4. Familiarizing themselves with some of the topics on the pilot's test, like drone safety procedures and the effects of wind/weather on drone flight.

STUDENT ASSESSMENT - what will be used to evaluate student progress and/or end of semester pass/fail status?

All classes abide by the following:

1. Student agrees to attend at least 80% of class sessions/lessons offered. Attendance is kept online and tracked by Partnership staff. Failure to meet 80% or be on track to meet 80% may result in program discontinuation.
2. The Partnership Student Assessment or Performance Form is filled out by the teacher and turned in to Partnership staff. The link to this form is found on the web page for this class. Failing marks for lack of participation, behavior issues, practice time, etc. may result in program discontinuation.

Class-specific assessment:

Our instructor will evaluate each student using Berrien's evaluation form and passing criteria will be based solely on students attending and actively participating in the class sessions.

Additionally, students will take our course pre/post assessment in Moodle. (We can provide your teachers with non-editing accounts to see our virtual Moodle courses upon request).

ADDITIONAL RESOURCES: (online, books, video, etc.):

Each student will have their own login with access to our virtual Moodle course in Drone Building.

CLASS POLICIES: ATTENDANCE, BEHAVIOR, WEATHER, ETC.

Attendance: attendance is required, and students should notify the instructor in advance of any absence.

Behavior: any behavior issues will first be privately brought to the attention of the parent and, should the behavior persist, to the partnership staff.

Weather: the classes will be cancelled on any days when Berrien Springs Public Schools are closed. We will also contact families to remind them of this in the event of a weather-related cancellation. We will make up any canceled class meetings at a later date.