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LESSON OBJECTIVES

TIME: 120 to 240 Minutes

STUDENTS WILL:

- Understand the basic physics of a quadcopter
- Understand the quadcopter electronic makeup
- Understand the basics of remote controlled building and flight of microquad
- IF APL: Understand First Person View flight and application

PROVIDED LESSON

MICRO FT GREMLIN

MATERIALS NEED

The FT Aircraft needed for this lesson is the FT Gremlin (Purchase with Spektrum RX).
See store for purchasing options

Flite Test FPV Goggles
(Purchase Battery For Uni)
See store for purchasing options

Click image!

Click image!

A soldering iron is needed for this lesson, having a few available is needed to accommodate the builds. See store for purchasing

Hot Soldering Iron
IMPORTANT SAFETY NOTE
REGARDING SOLDERING IRON

Soldering Irons get extremely hot, and should always be handled with care. Young students should always be supervised when using the iron. Review Soldering Iron safety with your students prior to use.

Sponsored Lesson

ACTIVITY ONE

GETTING TO KNOW YOUR FT GREMLIN

The FT Gremlin is one crazy little microquad and it has a lot of components, understanding how it works and what those components are is what is going to lead to greater success when building and flying your FT Gremlin.

The diagrams and questions below can be printed and assigned to the students to work it through either individually or as a whole group.

UNDERSTANDING THE PROPELLER

NOTE: Propellers use pitched airfoils to generate lift, based on diagram 1.1, answer the following questions posed in diagram 1.2

Diagram 1.1

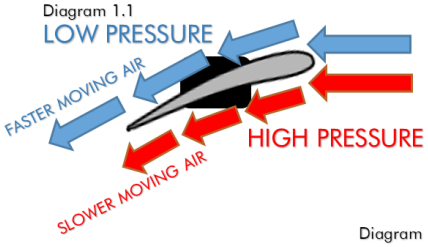
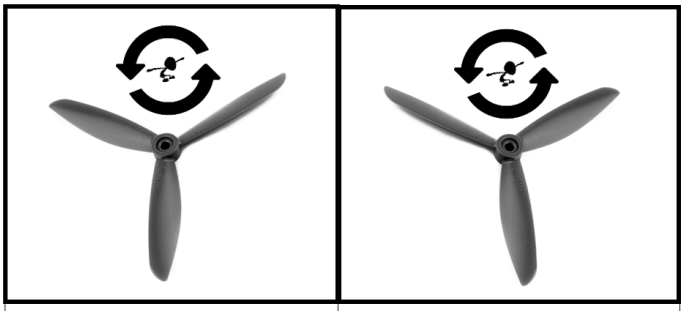


Diagram 1.2



DIRECTIONS: Based on the direction the props are spinning and their pitch angle, explain what happens and why?

MAKING CONNECTIONS

DIRECTIONS: Using the labeled propellers in diagram 1.3, place the correct propeller on the FT Gremlin quad.

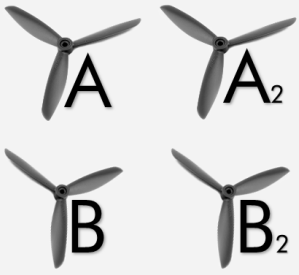
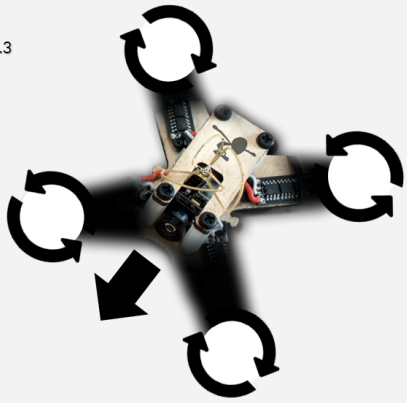
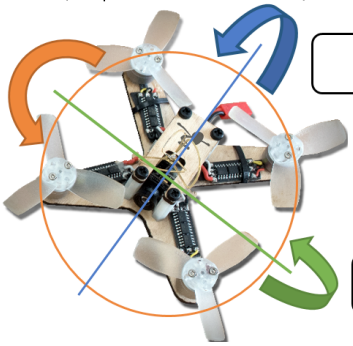


Diagram 1.3



UNDERSTANDING THE GREMLINS MOVEMENTS

DIRECTIONS: Using the internet, lecture, or past multirotor lessons, identify the pitch, roll, and yaw of the gremlin.



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ENTERTAINING, EDUCATING, AND ELEVATING THE WORLD OF FLIGHT!

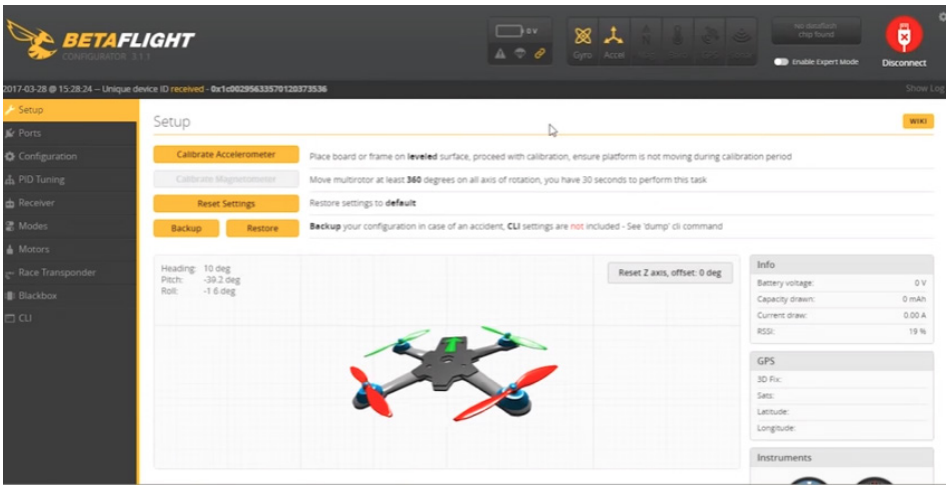
ACTIVITY TWO

BUILDING YOUR GREMLIN

Teachers and students can follow the build video here using the following link;

PROGRAMMING YOUR GREMLIN

Within the Gremlin build video you will notice that you will have to have the following software on a laptop present to properly program the students gremlins; (Click images for software links)



NOTES

Depending on how much help and students you have will determine the timing on the student building of the gremlin. Having two students per build seems to be the key ingredient for success, most high school students with no experience will be able to handle the learning curve of the gremlin build.

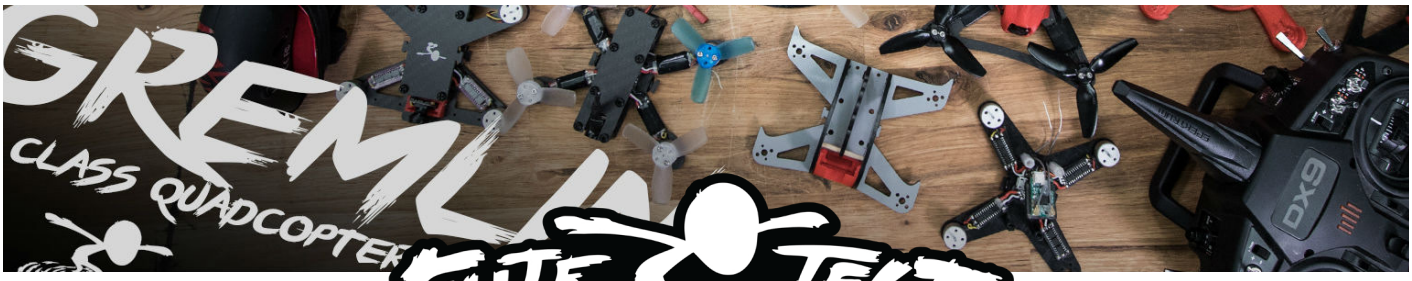
ACTIVITY THREE

TEST

It is not a bad idea for the teacher and the students to have watched the “How to” video on flying your multirotor and build prior to the build and fly event with your Young Eagles. After the building of the students Gremlin, have them practice flying them using the tips presented in the following video;

FUTURE EXTENDED LEARNING EVENTS

The first meeting is not going to be enough time for the students and advisors, plan a couple more get togethers where your students are maintaining and practicing using the gremlins, flying “line of sight” and “First Person View”. After the students feel like they are getting a good grasp on flying the gremlins, its time to have challenges and races where they can further their skills. With the same electronics and equipment, have the students design their own gremlin body frames either with 3D printers or other light weight material that can be machined. Challenging the students to create a frame with certain specified materials is a great STEM opportunity!



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