



The Ultimate Challenge

Unmanned Aerial Vehicles (UAVs) are driving one of the most exciting areas of innovation today. Pilots, engineers and entrepreneurial leaders are teaming up to change the way we think of videography, disaster recovery, agriculture, conservation, marketing and so much more.

After exploring basics of aeronautics and developing skills as pilots, students hack into a standard UAV brain, replace it with a custom programmable flight controller and configure it to fly different missions.

Standards Alignments

All programs align to the Common Core State Standards for Mathematics and English Language Arts and Next Generation Science Standards (NGSS). The Student UAV Challenge also aligns to CSTA level 3 standards.

Available Formats

- CLASS: Individual student accounts
- CLUB: Team accounts
- CAMP: 30 contact hours

Technology

The base technology is a remote controlled quadcopter. Focus lessons use electronics components and an Arduino microprocessor.

Curriculum Overview

Students fly, configure, reverse engineer, design, build and code.

The Student UAV Challenge curriculum begins with principles of aeronautics and flight for a variety of industries (ex. film vs. inspection). It ultimately leads students through a series of focus lessons that reverse engineer how each system of the UAV brain works. The culminating challenge is to replace the stock system with a customized Arduino-based flight controller.

In working with electrical components, students develop skills like soldering and critical thinking through troubleshooting.

Key focus lessons dive into concepts such as aerodynamics, electricity, computer programming and physical laws of motion.

As with all Student STEM Challenges, these concepts and skills are cultivated through the framework of innovation. Students model a business or organization that applies the technology to improve society.

Competition Overview (Optional)

UAV teams can compete in the National STEM League (NSL) through Face-to-Face (F2F) Competitions and the Online Points Race. Points leaders and F2F competition winners are invited to the NSL Finals.

Get Involved

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Option to Collaborate
& Compete in the NSL



Published and Organized By



STUDENT UAV CHALLENGE

CLASS vs. CLUB Options

Click-through lessons direct students' physical activity and analysis. Engineering logbooks are fundamental to the learning experience. In a CLASS, educators assess students with a mix of online quizzes and rubric-based evaluation of documentation, results and physical products.

The CLASS format provides one login per student while the CLUB provides one login per team. Both provide two educator logins.

Materials Options

Each UAV station serves up to 3 students with a very hands-on experience or 4-6 students who divide & conquer the various aspects of operating a team. Add additional UAV's to increase the hands-on team to 10 members. In addition to actively working with the UAV, team roles can include user interface design, graphic design, web design, marketing, public relations, project management, research & development, fabrication, community outreach, etc.

1, 2, 4 or 6-Station Contents

- 1, 2, 4 or 6 Booster Kits (contents shown below)
- 1 additional Quadcopter UAV per station
(This one is to fly. The Booster UAV will be hacked & flown.)
- Focus lesson kit on aeronautics that includes 2 x Bluetooth gliders per Station
- 1 Set of shared tools per two stations
- Student access to the SolidWorks® Student Edition

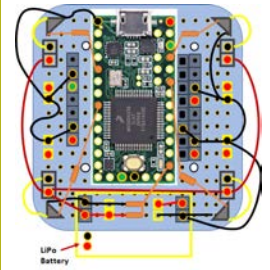
1-UAV Booster Kit Contents

- 1 x Quadcopter UAV (a.k.a. the Drone)
- 2 x UAV Lipo batteries
- 1 x UAV spare parts kit
- 1 x Flight Controller Brain kit including Arduino microcontroller, sensors, receiver, transmitter, electronic components, breadboard, cables and wires
- 1 x Soldering Kit
- 1 x Tool Kit

UAV CAMP KIT

This camp-specific curriculum is organized into a 5-day format with 25-40 contact hours depending on your program organization. Curriculum can also be organized into 1, 2 or 4- week summer camps.

The 6-UAV CAMP kit includes materials and printable student pack for six teams which is 18-30 students. Curriculum is appropriate for middle or high school students. Middle grade students spend more time on problem-solving and flight skills. High school students can focus more on programming and building flight controller hardware.



UAV CLASS & CLUB Startup Options

Should teams choose to participate in the National STEM League (NSL) the number of eligible teams is equal to the number of cars in their base kit. See the order forms for more details.

Class kits provide 1 curriculum login per student.

UAV CLASS Kit	Educator Licenses	Student Licenses	NSL Teams	Kit
Home	2	5	1	1-Station
Small	2	10	2	2-Station
Medium	2	16	4	4-Station
Full	2	24	6	6-Station

Club kits provide 1 curriculum login per team.

UAV CLUB Base Kit	Educator Licenses	Team Licenses	NSL Teams
1-Station	2	1	1
2-Station	2	2	2
4-Station	2	4	4
6-Station	2	6	6



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