



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 disaster recovery, agriculture, conservation, marketing and so much more.

Student UAV Challenge #1 is to hack into the brain of an Unmanned Aerial Vehicle (UAV), replace it with an Arduino-based flight controller and program it to fly different missions. In tackling this challenge, students integrate hardware and software systems. As importantly, they harness the ingenuity and passion of UAV pilots, software, electrical, and mechanical engineers to model their own technology business.

Available Formats

All programs are fully aligned to the Common Core, CSTA and NGSS frameworks as well as Engineering Pathway requirements.

- STEM Endorsement Course, 2 semesters
- Principles of Engineering Course, 2 semesters
- CTE Course, 2 semesters
- Out-of-School Club
- STEM Competition
- Summer Camp (1, 2 & 3 week camps)

Technology

The base technology is a small-scale quadcopter and Arduino-based microcontroller flight controller platform. Students have the option to apply the principles of data-driven design to design and fabricate a custom quadcopter rather than begin with Ten80's base UAV model.

Curriculum Overview

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

After exploring aeronautics, the science of flight, students prototype a new Arduino-based flight controller by reverse engineering a complete system piece by piece.

After mastering this first UAV Challenge, students extend their lessons learned to build a custom drone. In the process, students practice logical thinking, learn to work with microcontrollers, modify true code, use serial communication, and create user interfaces. 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 the web-based annual points race and in face-to-face competitions. Points leaders and Ten80 Invitational winners are invited to the NSL Finals.

Get Involved

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Option to Collaborate
& Compete in the "NSL"



Published and Organized By



UAV COURSE & CLUB KITS

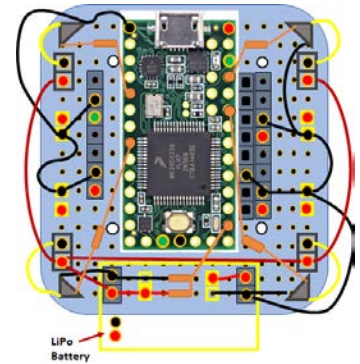
Begin with non-consumable 1, 2 or 6-Station UAV Base Kit. Add materials and teams with 1-UAV Booster Kits or additional UAV's.

Each UAV station serves 2-3 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.



Contents of a 1, 2 or 6-Station UAV Base Kit

- 1, 2 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
- Web consultation to help organize your program
- Online Curriculum - Logins for 2 educators per base kit and up to 30 students (1-Station = 5 students, 2-Station = 10 students, 6-Station = 30 students)
- 1, 2 or 3 Team registrations for one National STEM League season (1-Station = 1 team, 2-Station = 2 teams, 6-Station = 3 teams)



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

Curriculum modules can be organized into 1, 2 or 4- week summer camps with 5-day programs, 25-40 weekly contact hours depending on your program's organization.

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.

Contact us or download Ten80's latest secondary education catalog for more information on implementation options.



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