Discover Drones

**GRADE LEVELS:** 7-12

**EDUCATIONAL SETTING:**
In and out of school.

It is best to implement the Discover Drones program in a setting where instructors are able to finish the curriculum with one group of students before moving onto the next group. Because the drones must be assembled, alternating groups of students during the drone building and configuration process is not advisable.

**Implementation Time:**
Minimum of 12 hours of contact time up to 1 semester.

**Award Provides:**
- Hands-on drone equipment, curriculum, and storage serving up to 25 youth.
- Two-day educator workshop
- Two follow up virtual workshops (optional)
- Continuing education credit available
- $240 educator stipend

**Additional Cost(s) to Awardee in 2023-2024:**
- Travel to and from professional development workshops

**Approximate Sustainability Cost After Award Period:**
$150-250/year to cover wear and tear and replacement of parts

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2023-2024 STEM Scale-Up Program Summary:

Recognizing the potential for drones as a tool for STEM engagement and the opportunity to prepare students for emerging drone careers, PCS Edventures developed the Discover Drones kit for grades 7-12.

This full-featured kit includes everything needed to facilitate a drone program in both classroom and out-of-school settings, with scaffolded lessons in engineering, iterative design and applied science that encourage collaborative learning.

Learners begin by building RubiQ, a modular training drone. After learning the safety regulations and procedures surrounding unmanned aerial vehicles (UAVs), they move onto the basics of flight, first becoming comfortable on a flight simulator before moving onto line-of-sight piloting and eventually First-Person View (FPV) goggles.

PCS Edventures’ LABCard curriculum provides a tool that enables a more student-directed experience. Also included is access to Droneology EDU, a learning management system (LMS) with a fast-paced, interactive online course that prepares pilots of all skill levels for safe and responsible drone flight. The Droneology course covers topics of safety, laws and regulations, flight basics and the many uses of drones in industry and scientific research.

**Requirements to Implement the Program:**
1.) Educator(s) must participate in the initial two consecutive day in-person workshop with
2.) Educator(s) must participate in the STEM Council Scale-Up Educator Survey.
3.) Flight Sim Minimum Requirements: At least 5 devices with Windows or macOS operating systems. FPV Freerider is not compatible with iOS, Android or Chromebooks. Requires a USB port.
Iowa Standards Alignment:
The curriculum integrates with Iowa Core Standards for Physical Science, Engineering and Technology Literacy with Cross-Curricular Literacy connections. Highlights:

- **21.9-12.TL.6** “Demonstrate a sound understanding of technology concepts, systems and operations.” Students learn how to build and configure a drone, analyze technical documentation, complete training exercises using flight simulator software and ethical drone operation procedures.
- **21.9-12.TL.5** “Understand human, cultural, and societal issues related to technology and practice legal and ethical behavior.” Students learn about drone uses, safety, regulations, licensing and ethical use and conduct pre-flight safety checklists.
- **RST.11-12.3** “Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks; analyze the specific results based on explanations in the text.” Students utilize technical instructions to configure drone components including motors, batteries and sensors. Students run tests and troubleshoot problems according to analysis of results.

Materials and Curriculum:

**Materials:** serves 25 youth
- RubiQ Drone (w/ all parts for assembly): 5
- Spare Motors: 10
- Radio Controllers (w/ tether ability): 2
- Sets of FPV Goggles: 2
- Safety Glasses: 25
- Premium Controllers (for flight simulator): 5
- FPV Freerider Licenses (flight simulator): 10
- LiPo Batteries: 10
- LiPo-Safe Storage Bags: 4
- LiPo Battery Charger (w/ balance, charge, discharge & storage): 4

**Curriculum:**
- Discover Drones Educator Guide: 1
- LABCard Curriculum (20-card sets): 5
- Step-by-Step Drone Building Instructions: 6
- Expanding Folders (to hold all curriculum pages): 6
- Droneology EDU Class License: 1

**Storage:**
- Compartmentalized Storage Bins (w/ lids): 7

Professional Development:

**Duration:** Two consecutive days in-person

**Date(s):**
- NC Iowa: July 24-25 (Monday Tuesday)
- NE Iowa: July 27-28 (Thursday Friday)
- NW Iowa: July 31-Aug 1 (Monday Tuesday)
- SW Iowa: Aug 3-4 (Thursday Friday)
- SC Iowa: Aug 7-8 (Monday Tuesday)
- SE Iowa: Aug 10-11 (Thursday Friday)

*Specific locations within each region TBD*