

Drones



Mid-Valley
STEM-CTE HUB



www.midvalleystem.org
midvalleystemctehub@linnbenton.edu
Linn-Benton Community College
Albany Campus - CC-212



Drones

Drones are part of the Special Collection. The borrower must sign the agreement before using the pick-up and drop-off kit; the courier service does not transport this kit.

The DJI Tello Drone STEAM Kit offers an engaging, hands-on way for students to explore flight, coding concepts, and collaborative problem-solving. Designed for small teams, students use iPads to pilot drones through obstacle courses, building skills in spatial reasoning, communication, and iterative design. This kit supports active, inquiry-based learning while connecting classroom concepts to real-world applications in aviation, robotics, and engineering.



Grade Level

6 - 12 grades

Group Size

2-3 students per drone

Time Duration

1 hour - multiple sessions

Content of Kits

Components

- 5 DJI Tello Drones
- 5 iPads with Apple pencils and charging cords
- 1 Charging Dock
- 9 Batteries and 3 Battery charging cubes
- Extra drone blades



Usage

Getting Started

1. Lay out all kit items to ensure your kit is complete and matches the components list on the previous page. Please notify MVSCH if you are missing items.
2. Charge iPads and drone batteries before class. Each battery allows for ~5 - 10 minutes of flying time when fully charged.
3. Turn on the drones one at a time and connect via wifi individually so that mismatched drone/iPad connections do not occur.
4. Take off and land using the button at the top right of the iPad screen.
5. Use the on-screen controls like joysticks rather than buttons. Have the student only do one control at a time; this allows for the safest flying practices.
6. Access iPads by typing in MILLT229 to unlock the device. The TELLO app is already installed on the iPads provided.
7. Create work group of 2-4 students and assign or rotate the following roles: pilot, navigator, spotter, and course designer.

Storage

- Remove battery from drone and store inside provided drone packaging when drones are not in use.
- Organize all items in separate bags, chargers, batteries, etc.

Troubleshooting

- **Connecting iPad and TELLO:** Close out of the TELLO app. Turn on the drone by holding the power button on the side until the light on the front of the drone briefly flashes. Go into iPad settings > wifi > link to TELLO #____ that corresponds with the number written on the drone. Open the TELLO app.
- If the iPad drops the app or the app freezes mid-flight, restarting the program will automatically reconnect the drone to the iPad.
- Visit www.ryzerobotics.com/tello/faq for troubleshooting.



Activity Guide

Beginner

Mastering Basic Controls

Explore the fundamentals of drone flight using simple, guided movements. In teams of 2–3, students take turns in assigned roles (pilot, navigator, spotter) to practice basic controls such as takeoff, landing, hovering, and directional movement (forward, backward, left, right, and rotation). Teams will work within a clearly defined flight zone to complete short challenges, like lifting off and landing on a target or maintaining a steady hover for a set amount of time. This activity builds confidence with the controls while establishing safe operation habits and effective team communication.

Advanced

Scavenger Hunt

Students navigate their drone to locate and reach a series of targets placed throughout the flight area. Targets may include visual markers, objects, or designated landing zones that require precise movement and control. Teams must plan efficient routes, communicate clearly, and adapt in real time as they pilot the drone from one target to the next. Roles (pilot, navigator, spotter) should rotate to ensure full participation. Encourage multiple attempts so students can refine strategies, improve accuracy, and complete the hunt as efficiently as possible.

Intermediate

Design and Fly a Maze

Build on basic drone skills to design and navigate a custom obstacle course. In teams of 2–3, they create a simple maze using classroom materials (cones, tape, or markers) with defined paths, turns, and checkpoints. Teams plan their route, then pilot the drone through the maze, adjusting speed and direction to complete the course. Students test, evaluate, and refine both their maze design and flight strategy through multiple attempts. Rotate roles (pilot, navigator, spotter) so all team members engage in each part of the challenge. This activity strengthens problem-solving, spatial reasoning, teamwork, and precision control.

Extension Activities:

Scavenger Hunt Time Trials

Students build on the scavenger hunt challenge by introducing timed competition. Students navigate their drone through a series of targets as quickly and accurately as possible, aiming to complete the course in the shortest time. Teams must balance speed with control, avoiding penalties for missed targets, collisions, or unsafe flying. Encourage students to plan optimized routes, refine communication, and adjust strategies between timed attempts. This activity emphasizes precision under pressure, strategic thinking, and continuous improvement while adding an engaging, competitive element to the learning experience.



Learning Extensions

STEAM Connections: Engineering - Math - Technology

Learning Objectives:

- Develop foundational understanding of drone flight principles, including lift, thrust, stability, and directional control.
- Apply computational thinking skills by planning, sequencing, and executing flight paths through obstacle courses.
- Strengthen problem-solving abilities by testing, troubleshooting, and refining flight strategies in real time.
- Practice spatial reasoning by navigating drones through physical environments with precision and awareness of obstacles.
- Interpret cause-and-effect relationships between control inputs and drone movement.
- Engage in iterative design by improving obstacle course navigation through repeated trials and adjustments.

Career Connections:

- Drone Piloting
- ROV Operator
- Airplane and Helicopter Piloting
- Data Analysis
- Drone Engineering
- Software Developer

Essential Employability Skills:

- Technology Literacy
- Collaboration
- Interpersonal Communication
- Adaptability
- Responsibility & Accountability
- Attention to Detail





Resources and Accessibility

Safety Guidelines

- Always fly in open spaces that are clear of obstacles and people.
- Always have at least one student acting as a safety/spotter while another student is piloting a drone. This helps reduce the risk of drone collisions and personal injury from drone accidents.
- Keep hands, hair, and loose clothing away from spinning propellers at all times.
- Only fly drones at appropriate heights and speeds for indoor environments to maintain control and reduce risk.
- Immediately land the drone if it becomes unstable, unresponsive, or unsafe.

Accessibility

- Offer flexible roles within each group (pilot, navigator, spotter, course designer) so all students can participate in ways that match their strengths and comfort levels.
- Provide visual supports such as labeled obstacle maps, step-by-step flight plans, or color-coded course markers to aid comprehension.
- Provide seated or stationary participation options for students with mobility needs (e.g., navigator role using iPad, directing teammates).
- Incorporate assistive technology features on iPads (voice control, screen zoom, guided access) as needed.
- Allow additional time for planning, practice, and completion to support different processing speeds.

Library Catalog



Library Resources



Feedback

QR to feedback survey

