Finch Flock

Mid-Valley
STEM-CTE HUB

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Finch Robot:
Classroom Flock Kit

The Finch Robot Classroom Flock Kit offers an engaging, hands-on approach to STEM learning. It provides students from kindergarten to college with a programmable robot that brings computer science to life. This kit enables exploration of coding and robotics through a series of interactive activities. The Finch Robot supports a range of programming languages—from icon-based coding for early learners to text-based programming for advanced students, making it versatile across educational levels.

Grade Level
K - 12th grades

Group Size
Up to 4 students per robot

Time Duration
1 - 3 Hours

Content of Kits

Components

- 5 Finch Robots
- 5 USB-C Charging Cables
- 1 USB Charging Hub
- 1 Carrying Case with padded interior designed for 5 robots and accessories

Suggested

- Tablets or Chromebooks (not included)

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Usage

Getting Started

1. **Unpack the Kit:** Carefully remove all components from the carrying case.

2. **Install Programming Software:** Depending on the student's grade level and experience, choose an appropriate programming language:
    - FinchBlox: Icon-based, suitable for pre-readers (available on iOS, Android, Fire OS).
    - BirdBlox: Block-based, suitable for elementary students (available on iOS, Android, Fire OS).
    - MakeCode or Snap!: Block-based, suitable for middle school students (available on Chromebooks, Mac, Windows, Linux).
    - Python or Java: Text-based, suitable for high school students (available on Chromebooks, Mac, Windows).

3. **Charge the Robots:** Connect each Finch Robot to the USB Charging Hub using the provided USB-C cables. (approximately 4 hours for a full charge).

4. **Connect the Finch Robot:** Pair each Finch Robot with a device via Bluetooth or USB, following the instructions provided in the Finch Robot 2.0 Start Teaching Guide.

5. **Calibrate Sensors (if necessary):** Follow the calibration procedures outlined in the user manual to ensure accurate sensor readings.

Storage

- After each session, power off the Finch Robots.
- Store the robots and accessories in the provided carrying case to prevent damage and ensure easy access for future use.

Troubleshooting

- **Connectivity Issues:**
    - Ensure the Finch Robot is charged and within range of the device.
    - Restart both the robot and the device, and attempt to reconnect.
- **Sensor Calibration:**
    - If sensors are not responding accurately, recalibrate them following the user manual instructions.
- **Software Updates:**
    - Regularly check for updates to the programming software and firmware to ensure optimal performance.

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Activity Guide

Beginner

Intro to Finch Robot Movement
Students will use block-based coding to control the Finch Robot's movement. They will write simple commands to move forward, turn, and stop, then navigate a taped obstacle course. This activity builds basic coding skills and connects programming to real-world motion.

Intermediate

Finch Robot Line Follower
Students program the Finch Robot to detect and follow a black line using sensors. They will adjust their code to improve accuracy and experiment with different line shapes. This reinforces conditional logic, sensor feedback, and autonomous navigation concepts.

Advanced

Finch Robot Collaborative Challenge
Students program multiple Finch Robots to work together on a task, such as synchronized movement or object transport. They will use more advanced coding concepts like loops, variables, and sensor-based decision-making to coordinate robot actions. This project encourages problem-solving, teamwork, and computational thinking, preparing students for more complex robotics applications in automation, engineering, and AI.

Extension Activities:

Finch Robotics Challenge Series
Students will compete in a four-part challenge series, testing their coding, problem-solving, and teamwork skills. Each challenge will focus on different Finch Robot capabilities:

1. **Speed & Navigation Race** – Students program their Finch to navigate a maze as quickly as possible using movement and sensor feedback.
2. **Line-Following Accuracy** – Teams program their Finch Robot to follow a complex track with curves and intersections, fine-tuning the code for better accuracy.
3. **Object Interaction Task** – Robots must push or transport an object to a designated location using precise movement and sensor input.

Synchronized Teamwork – Teams program multiple Finch Robots to work together in a choreographed routine or coordinated task.

Scores from all events will determine the winning team. This competition builds computational thinking, creativity, and real-world robotics skills.

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Learning Extensions

STEAM Connections: Robotics - Computer Science - Coding

Learning Objectives:

- Develop foundational skills in computer science and robotics.
- Foster problem-solving and critical thinking through hands-on coding and robotics activities.
- Encourage creativity and innovation by designing and implementing unique projects.
- Promote collaboration and communication among students working in pairs or small groups.

Career Connections:

- **Robotics Engineer:** Designing and building robotic systems.
- **Software Developer:** Creates software applications and systems, from games to enterprise-level software.
- **Computer Scientist:** Researching and developing new computing technologies**.**
- **STEM Educator:** Inspires and teaches the next generation of innovators through hands-on activities in science, technology, engineering, and mathematics.

Essential Employability Skills:

- Critical thinking
- Problem-solving
- Creativity
- Teamwork
- Communication

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Resources and Accessibility

Safety Guidelines

- Supervise all activities involving the Finch Robots to ensure they are used properly and safely.
- Remind students to handle the robots and accessories gently to prevent damage.
- Keep small parts, such as markers and USB cables, organized and out of reach of young children when not in use.
- Ensure that charging cables are used properly and stored safely to prevent tripping hazards.

Accessibility

- Ensure workspaces are organized and free of obstacles to accommodate all students, including those with physical disabilities.
- Provide alternative input methods or assistive technologies/tools as needed to support diverse learning needs.

Library Catalog

Library Resources

Feedback

QR to feedback survey