Coding for Conservation

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Table of Contents

Goals and Objectives---------- page 3

Florida Standards ---------- page 4

Course Outline/Overview ---------- page 5

Lessons Plans and Step-by-Step Guide in Implementing ---------- page 6-8

Resource List ---------- page 9

Goals and Objectives

STEAM Integration with Environmental Awareness

This workshop is designed to build teacher confidence in integrating computer science and environmental education into primary classrooms. By using Bee-Bots, educators will learn how to teach foundational coding skills while fostering conservation awareness, specifically focusing on the importance of bees and pollinators.

Participants will explore how coding connects to real-world issues by engaging students in lessons about:

- The life cycle of bees
- The role of pollinators in ecosystems
- Environmental stewardship and conservation practices

Teacher Confidence in Computer Science

Many primary teachers may feel uncertain about teaching coding concepts. This workshop demonstrates that coding at the K–2 level is accessible and rooted in simple skills such as sequencing, directionality, and problem-solving.

Teachers will leave with:

- Practical strategies for integrating coding with literacy and science
- Ready-to-use lesson ideas and materials
- Confidence in facilitating hands-on coding activities

Student Skill Development

Through modeled activities, teachers will see how students can develop:

- Critical thinking and problem-solving
- Sequencing and logical reasoning
- Collaboration and communication skills
- Early computer science literacy

Florida Standards Alignment (K–2)

Science Standards

- **SC.K.L.14.3 / SC.1.L.17.1 / SC.2.L.17.1:** Recognize that plants and animals (including bees) have basic needs and roles in the environment
- **SC.2.L.16.1:** Observe and describe major stages in the life cycles of animals

Computer Science Standards (Florida K–2)

- **SC.K2.CS-CP.2.1:** Define a program as a sequence of commands created by people
- **SC.K2.CS-CP.2.2:** Create and test simple programs through sequencing
- **SC.K2.CS-AP.1.1:** Decompose problems into smaller steps
- **SC.K2.CS-AP.1.2:** Use step-by-step instructions to solve problems

ELA Integration

- **LAFS.K.RI / LAFS.1.RI / LAFS.2.RI:** Ask and answer questions about informational texts
- Retell key ideas about bees and conservation

Course Outline/Overview

This interactive workshop introduces teachers to Bee-Bots as a tool for integrating coding with science and literacy. Participants will engage in a model lesson built around a read-aloud text about protecting bees (e.g., *"Save the Bees," "Bee Dance"* or similar primary-level text).

Workshop Components

1. **Introduction to Bee-Bots**
    - Basic commands (forward, backward, left, right)
    - Hands-on exploration
2. **Literacy Connection**
    - Read-aloud of a conservation-focused book about bees
    - Discussion on pollinators and environmental importance
3. **Science Integration**
    - Exploration of the bee life cycle
    - Connections to ecosystems and food production
4. **Coding Challenge**
    - Teachers create grid mats representing:
        - Bee life cycle stages
        - Flower pollination paths
    - Participants program Bee-Bots to navigate through sequences
5. **Collaboration and Problem Solving**
    - Debugging activities
    - Group challenges

Lesson Plans and Step-by-Step Guide in Implementing

Objectives

Students will:

- Understand the importance of bees and their life cycle
- Use sequencing and coding skills to guide a Bee-Bot through a related task
- Collaborate to solve problems and debug code

Materials

- Bee-Bots
- Coding mats or grid boards
- Bee life cycle cards (egg, larva, pupa, adult)
- Book about bees (e.g., conservation-focused text)
- Direction cards (forward, turn left/right)
- Chart paper / worksheets

Classroom Setup

- Students work in small groups (3–5 students)
- Each group has a Bee-Bot and coding mat
- Life cycle visuals placed on grid

Lesson Sequence

Before the Lesson

- Introduce sequencing through games (Simon Says, movement activities)
- Read a story about bees and discuss:
    - Why bees are important
    - How humans can help protect them

During the Lesson

1. **Mini-Lesson**
    - Introduce Bee-Bot functions

    - Model a simple coding sequence
2. **Activity**
    - Students program Bee-Bot to travel through the life cycle stages in order
    - Extension: Navigate to flowers to simulate pollination
3. **Collaboration**
    - Students discuss and plan their code before testing
    - Debug errors and revise sequences

After the Lesson

- Reflect on:
    - What students learned about bees
    - How coding helped solve the problem

Assessment

- Observation of collaboration and participation
- Accuracy of coding sequences
- Student explanations of bee life cycle and conservation

Adaptability

This lesson can be easily adapted for different levels:

For Kindergarten

- Simple forward/backward movement
- Focus on identifying bees and flowers

For First Grade

- Add turns and basic sequencing
- Introduce simple life cycle order

For Second Grade

- Full sequencing and debugging
- Complex pathways (pollination routes)

- Incorporate student-created grids

Cross-Curricular Extensions

- **Math:** Counting steps, directional movement
- **Art:** Create bee habitats or pollinator gardens
- **Writing:** Students create stories about helping bees

Resources

- Bee-Bot classroom kits
- Printable life cycle cards
- Conservation-themed read-alouds
- Teacher-created coding mats

Impact

This workshop empowers teachers to:

- Integrate computer science in meaningful ways
- Connect coding to real-world environmental issues
- Inspire young learners to become problem-solvers and environmental stewards

By combining technology and conservation, this lesson promotes both future-ready skills and environmental responsibility in early learners.

Resource List

Internet Resource List

- **Terrapin Robotics Portal:** https://www.terrapinlogo.com/products/robots/bee-bot.html – Free activity mats, downloadable user manuals, and physical command cards.
- **Florida CPALMS Official Platform:** https://www.cpalms.org – Comprehensive indexing of the current July 2024 Computer Science and Life Science curriculum tools.
- **The Xerces Society for Invertebrate Conservation:** https://www.xerces.org – Classroom-safe printouts, pollinator identification sheets, and youth-centric save-the-bees literature.
- **Planet Bee Foundation Resources:** https://www.planetbee.org – Free standards-aligned lesson blueprints focused directly on bee lifecycles and ecosystem stability.
- **Bee Bot Mats**: https://beebotmats.com – Shop for mats for the bee bots and classroom accessories or watch How-To-Videos.

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