THE EDUCATION FUND
FOR EXCELLENCE IN MIAMI-DADE PUBLIC SCHOOLS

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Ideas with IMPACT

ROBOTICS

Kinder Science: "Bee" Coding

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Kindergarten Science: "Bee" Coding

ABSTRACT

This project will introduce coding concepts to kindergarten students using Bee-Bot robots in an engaging, developmentally appropriate way. Through hands-on activities, students will learn basic programming skills such as sequencing, directionality, and problem-solving. Lessons will be aligned with early learning standards and designed to promote collaboration, critical thinking, and creativity.

Farley, Marcelle A.

For information concerning Ideas with IMPACT opportunities, including Adapter and Disseminator grants, please contact: The Education Fund

305-558-4544, Ext. 113

Email: audrey@educationfund.orgwww.educationfund.org

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Objectives

Learning Directions and Sequencing - Students will use directional cards to plan a sequence of moves (e.g., forward, turn left) before inputting them into the Bee-Bot. This reinforces spatial awareness and logical thinking.

Literacy Integration: Letter and Word Recognition - Students will code Bee-Bots to move to letter tiles or sight words on a floor grid. For example, they may be asked to guide the Bee-Bot to the beginning sound of a picture card or spell simple CVC words.

Math Integration: Counting and Number Recognition - Using a number grid, students will program the Bee-Bot to travel to the correct answer for a math problem (e.g., move to the number that answers “2 + 3”).

Story Retelling and Comprehension - Students will code Bee-Bots to travel through a sequence of story events laid out on a mat, helping them understand narrative order and cause-effect relationships.

STEM Challenges and Problem Solving - In small teams, students will complete challenges such as designing mazes or obstacle courses for Bee-Bots, testing and debugging their code to solve specific tasks.

Collaborative Learning and Communication Skills - Activities are designed for pairs or small groups, requiring students to take turns, discuss their ideas, and work together to correct errors in their code.

Florida Standards

MA.K.NSO.1.2 - Given a number from 0 to 20, count out that many objects.

MA.K.NSO 1.3 - Identify positions of objects within a sequence using the words “first,” “second,” “third,” “fourth,” or “fifth.”

MA.K.M.1.3 - Express the length of an object, up to 20 units long, as a whole number of lengths by laying non-standard objects end to end with no gaps or overlaps.

MA.K.GR.1.3 - Identify two- and three-dimensional figures regardless of their size or orientation. Figures are limited to circles, triangles, rectangles, squares, spheres, cubes, cones, and cylinders.

MA.K.DP.1.1 - Collect and sort objects into categories and compare the categories by counting the objects in each category. Report the results verbally, with a written numeral or with drawings.

MA.K.GR.1.1 – Identify two-dimensional figures regardless of their size or orientation. Figures are limited to circles, triangles, rectangles, and squares (as special rectangles).

ELA.K.F.1.2 – Demonstrate phonological awareness by identifying and producing rhyming words and recognizing spoken words, syllables, and sounds (phonemes).

MA.K.AR.1.2 – Solve real-world addition and subtraction problems within 10 using objects and drawings.

CS.K12.ELA.K1.1 – Identify the steps of a sequence to solve a problem or complete a task.

CS.K12.OC.1.1 – Collaborate with peers using age-appropriate technology tools to complete a task.

Lesson Plan: Counting with Bee Bots

LEARNING OBJECTIVE:

Students will be able to count out objects from 0 to 20.

ASSESSMENTS:

Students will demonstrate their ability to count by using Bee Bots to move to a designated number of objects.

KEY POINTS:

Understanding numbers from 0 to 20.

Counting objects accurately.

Using Bee Bots to represent counting in a fun way.

Connecting physical counting with coding instructions.

OPENING:

Begin with a fun counting song that includes movements.

Ask students, "How many of you can count to 10? Can you show me?"

Introduce the Bee Bot and explain that it will help us count objects today.

INTRODUCTION TO NEW MATERIAL:

Show how to count objects using physical items (blocks, counters).

Explain how the Bee Bot can be programmed to move to a certain number of objects.

Demonstrate counting out loud as you program the Bee Bot to “move forward” to the number of objects.

Anticipate that students might confuse the direction of counting (forward vs. backward).

GUIDED PRACTICE:

Have students work in pairs to choose a number (1-10) and find that many objects in the classroom.

Guide them through programming the Bee Bot to move to that number.

Scaffold questioning:

"If we have 3 objects, how many steps will the Bee Bot need to take?"

"What if we add one more object?"

Monitor student performance by observing their counting and programming.

INDEPENDENT PRACTICE:

Students will each choose a number from 0 to 20 and gather that many objects.

They will program the Bee Bot to move to that number and present their findings to the class.

Set clear expectations for behavior: work quietly, help each other, and stay on task.

CLOSING:

Gather students for a quick review of counting by having them show their counted objects and the corresponding Bee Bot movements.

Ask, "What did we learn about counting today?"

EXTENSION ACTIVITY:

For students who finish early, provide additional counting challenges where they program the Bee Bot to count backward or to skip count (e.g., count by 2s).

HOMEWORK:

Students will create a counting booklet at home where they draw or use stickers to represent numbers from 0 to 10.

STANDARDS ALIGNED:

MA.K.NSO.1.2: Given a number from 0 to 20, count out that many objects.

MA.K.CC.4: Understand the relationship between numbers and quantities; connect counting to cardinality.

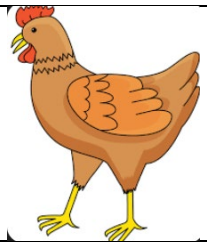
MA.K.CC.5: Count to answer "how many?" questions.

Bee-Bot Kindergarten Worksheet: Let's Go to the Farm!

Name: _____ Date: _____

Directions: Look at the Bee-Bot grid below. The Bee-Bot wants to visit all the animals on the farm. Draw a line to show the path the Bee-Bot should take. Then, draw the arrows to show the Bee-Bot's path!

Grid Mat:

START			
			
			
			

Path 1: Go from START to the COW.

How many steps forward? _____

Which way do you turn? (Draw an arrow) _____

How many steps forward? _____

Draw your commands here:

Path 2: Go from the COW to the PIG.

Which way do you turn? (Draw an arrow) _____

How many steps forward? _____

Which way do you turn? (Draw an arrow) _____

How many steps forward? _____

Draw your commands here:

Path 3: Go from the PIG to the HEN.

Which way do you turn? (Draw an arrow) _____

How many steps forward? _____

Draw your commands here:

Path 4: Go from the HEN to the GOAT.

Which way do you turn? (Draw an arrow) _____

How many steps forward? _____

Draw your commands here:

Bonus Challenge:

Can you make the Bee-Bot go back to the START from the GOAT? Draw the arrows to show how!

My Bee-Bot Path:

Teacher's Note:

This worksheet can be used in a center or small group setting.

Before starting, review the Bee-Bot's buttons: forward, backward, left turn, right turn, and clear.

The grid can be a physical mat on the floor, a printed mat, or a projected image.

Encourage students to use "unplugged" coding cards (physical cards with arrows on them) to plan their paths before pressing the buttons on the Bee-Bot. This reinforces the concept of an algorithm.

The "Draw an arrow" sections are for students to practice drawing the directional symbols (curved arrows for turns, straight arrows for forward/backward) that correspond to the Bee-Bot's buttons.

Tips and Tricks for Preparing the Classroom and Students for Bee Bot

Classroom Preparation

Designated Bee Bot Area:

Create a specific space in the classroom for Bee Bot activities, ensuring it's free from distractions.

Clear Pathways:

Set up a clear and open area for the Bee Bots to move. Use tape or mats to mark pathways and grid layouts.

Organize Materials:

Gather counting objects (blocks, counters, etc.) and keep them organized for easy access during lessons.

Technology Setup:

Ensure that Bee Bots are charged and functioning properly. Test them before class to avoid disruptions.

Visual Aids:

Use posters or charts displaying basic coding commands and number lines to reinforce learning.

Student Preparation

Introduce Bee Bots:

Start with an engaging introduction to Bee Bots, showing how they work and what they can do.

Basic Coding Concepts:

Teach fundamental coding concepts such as forward, backward, left, and right movements using simple language.

Hands-On Practice:

Allow students to practice programming Bee Bots with minimal guidance to build confidence.

Group Collaboration:

Encourage teamwork by having students work in pairs or small groups to solve problems and complete tasks together.

Set Expectations:

Clearly communicate behavior expectations during activities, emphasizing respect for equipment and peers.

Tips for Effective Use

Start Simple:

Begin with basic counting and movement tasks before introducing more complex coding challenges.

Use Storytelling:

Incorporate storytelling into lessons, where students program Bee Bots to follow a story path or solve a mystery.

Integrate Other Subjects:

Combine Bee Bot activities with subjects like math, science, and literacy for cross-curricular learning.

Encourage Reflection:

After activities, have students discuss what worked well and what challenges they faced, fostering a growth mindset.

Celebrate Success:

Celebrate achievements, no matter how small, to motivate students and build enthusiasm for future coding lessons.

Resources:

Magic Schools AI