Unit 3: Introduction To Bee Bots

Content Area: **Technology**
Course(s): **Technology**
Time Period: **Week 17**
Length: **8 Weeks**
Status: **Published**

Unit Overview

Students will be introduced to their first engineering unit using the book Rosie Revere, Engineer by Andrew Beaty and David Roberts and BeeBots. BeeBots are sturdy programmable robots designed for use by very young children. Learning to control a physical object using commands is an excellent introduction to computational thinking and early programming skills. Students learn to break down a task into smaller steps, understand the importance of ordering instructions, learn to work collaboratively and have fun.

Standards

CRP.K-12.CRP1.1	Career-ready individuals understand the obligations and responsibilities of being a member of a community, and they demonstrate this understanding every day through their interactions with others. They are conscientious of the impacts of their decisions on others and the environment around them. They think about the near-term and long-term consequences of their actions and seek to act in ways that contribute to the betterment of their teams, families, community and workplace. They are reliable and consistent in going beyond the minimum expectation and in participating in activities that serve the greater good.
CRP.K-12.CRP2.1	Career-ready individuals readily access and use the knowledge and skills acquired through experience and education to be more productive. They make connections between abstract concepts with real-world applications, and they make correct insights about when it is appropriate to apply the use of an academic skill in a workplace situation.
TEC.K-12.8.2.B	Design Process and Impact Assessment
TECH.8.2.2.E	Computational Thinking: Programming: Computational thinking builds and enhances problem solving, allowing students to move beyond using knowledge to creating knowledge.
TECH.8.2.2.E.1	List and demonstrate the steps to an everyday task.
TECH.8.2.2.E.2	Demonstrate an understanding of how a computer takes input through a series of written commands and then interprets and displays information as output.
TECH.8.2.2.E.3	Create algorithms (a sets of instructions) using a pre-defined set of commands (e.g., to move a student or a character through a maze).
TECH.8.2.2.E.4	Debug an algorithm (i.e., correct an error).
TECH.8.2.2.E.5	Use appropriate terms in conversation (e.g., basic vocabulary words: input, output, the operating system, debug, and algorithm).
TECH.8.2.2.E.CS1	Computational thinking and computer programming as tools used in design and engineering.

Essential Questions

- What does an engineer do?

- What is a robot?
- How do I make a robot do what I want it to?
- Can a system continue to operate with a missing or malfunction component?

Application of Knowledge: Students will know that...

- Engineers have an impact on the world they live in and their daily lives.
- Letters have specific shapes and can be recognized
- Numbers can be added together to make a bigger number
- Numbers go from 0-10 on a number line
- Programming tasks need to be broken down into a specific order of instruction.
- There are different buttons on the BeeBot, the buttons will move the Beebot in different ways

Application of Skills: Students will be able to...

- Break down a task into small, simple steps that the robot will follow in a specific order.
- Design process is fundamental to technology and engineering
- Program the BeeBot to move forward, back, left, right and go in different combinations to accomplish specific tasks
- Reset the previous BeeBot program by using the correct process

Assessments

- Task observation
    - Students will be observed in the various tasks to see that they understand each task and will be given help if they are having difficulty.

Suggested Activities

- Engineer of the Week: Each week, a new engineer will be briefly introduced to the class, highlighting their impact on their current world.
- Read Rosie Revere Engineer. Create engineer teams to help fix the cheese copter in the story.
- BeeBot Free Play- Students are shown what the 4 directional buttons do and can explore their use.
- BeeBot Counting- Using laminated number lines around the room, students "teach" their Beebots each number by programming it to go forward that many steps
- BeeBot Adding- Using laminated number lines around the room, students "teach" their BeeBots to add by programming it to go forward to the first number, then the second number and seeing where the BeeBot ends up
- BeeBot Subtracting - using laminated number lines around the room, students "teach" their BeeBot to

subtract by programming it to go forward to the first number, then backwards to the second number of steps, and seeing where the BeeBot ends up.
- BeetBot Letter Recognition - using block letters made from masking tape, students "teach" their BeeBot to recognize different letters. Each letter should be made from a whole multiple of BeeBot steps. Letters can include letters like F, H, and R that need backtracking. Students should be taught the math technique of "acting out" where the move their BeeBot manually as they program their BeeBot.
- BeeBot Race - students program their BeeBot to go across a start line to a finish line and race their BeeBots across the course.

Activities to Differentiate Instruction

- Behavior modification reward system to encourage time on task so that work is completed
- Partner with a capable learner. Closely monitor partner work
- Periodically, review the student's maintenance of their folders and incomplete work
- Provide individualized checklists of the directions for a task in support of the thorough execution of directions.
- Proximal seating for all large group work

Enrichment Opportunities:

Advanced Programing Activity- Stage 1 www.code.org

Integrated/Cross-Disciplinary Instruction

- ELA - letter recognition
- Math- counting, adding, subtracting

Resources

- Laminted BeeBot number lines
- Masking tape
- Bee Bots- 1 for each group of 3 students
- Large dice
- Directional cards
- Rosie Revere- by Andrea Beaty and David Roberts
- Iggy Peck, Architect by Andrea Beaty and David Robert
- The Most Magnificent Thing By Ashley Spires
- What Do You Do With An Idea? By Kobi Yamada and Mae Besom