

BeeBot Engineering Challenge

Writer: jheffernan11

Unit or Course: PK-6 Engineering Education Curriculum (EEC)

Lesson Duration: 45

Preparation Time: 30

Grades: K

Topics or Keywords: robotics, engineering

Lesson Overview

Students help their BeeBot get from the hive to the flower. They must program their BeeBot to get around an obstacle. This culminating BeeBot lesson is an open ended engineering challenge. Students are encouraged to plan a route and also document the route their BeeBot took.

Attachments:

Alignment to Standards

Academic Standards

Mathematics Disciplines :Number Sense and Operations Strand, PreK

K.N.1.

Count by ones to at least 20.

Mathematics Disciplines :Measurement Strand, PreK

K.M.2.

Make and use estimates of measurements from everyday experiences.

Mathematics Disciplines :Measurement Strand, PreK

K.M.3.

Use nonstandard units to measure length, area, weight, and capacity.

Science and Technology/Engineering Disciplines :Physical Sciences (preK-8) Strand, PreK

3.

Describe the various ways that objects can move, such as in a straight line, zigzag, back-and-forth, round-and-round, fast, and slow.

Science and Technology/Engineering Disciplines :Life Science (preK-8) Strand, PreK

8.

Identify the ways in which an organism's habitat provides for its basic needs (plants require air, water, nutrients, and light; animals require food, water, air, and shelter).

Science and Technology/Engineering Disciplines :Life Science (preK-8) Strand, PreK

6.

Recognize that people and other animals interact with the environment through their senses of sight, hearing, touch, smell, and taste.

Technology Literacy Standards and Expectations Disciplines :Ethics and Safety Strand, K

2.1.

Follow classroom rules for the responsible use of computers, peripheral devices, and resources.

Technology Literacy Standards and Expectations Disciplines :Research, Problem Solving and Communication Strand, K

3.1.

Use various age-appropriate technologies to locate, collect, and organize information.

Vocational Standards

<h2>Assessments</h2>

Assessment Instructions

The teacher(s) will note the following for each team on a checklist:

- 1) Teamwork - did the students work together to solve the problem?
- 2) Did BeeBot get to the flower? Did it get back?
- 3) Did students plan a route to the flower that the BeeBot could follow?
- 4) Did the students map of the actual route taken reflect the actual path taken?

Attachments:

Products And Performances

Students fill in this map after they finish the assignment. They could also use it for planning purposes.

Attachments:

MCAS Questions

Instructional Strategies

Key Concepts

Can students think ahead and plan a route for their robot to take?

Can they adjust the route if not successful?

Can students estimate and project out the number of steps needed to their route and adjust according to what they see?

Students may not be aware of it, but they are experiencing the engineering design process.

Attachments:

Specific Skills

Students should know how to:

- 1) Operate the left, right, forward, reverse, and clear buttons on the BeeBot.
- 2) Take turns using the BeeBot.
- 3) Project the route a BeeBot will take based on what they program.
- 3) Have an idea how much the BeeBot moves for one forward or reverse step.

Attachments:

Activities And Procedures

Teacher lays out the obstacle courses for each pair of students. The course consists of a starting hive, a flower, and a 12 inch block between the hive and the flower.

Teacher explains problem to the group using a story context of the bees needing to get pollen to make honey. If appropriate, more can be taught about bees and honey.

One or more students can be called on to map out a proposed route with by walking it.

Students walk their own proposed routes on their individual obstacle course. Optionally, they can draw them on the map.

Students then take turns programming their robot to get from the hive to the flower.

After time is up or they succeed, students document the route their BeeBot took on the map.

Notes:

- 1) There is no requirement that the BeeBot start facing the flower directly but the teacher should do the demonstration this way.
- 2) Make sure students do not move the BeeBot manually to fix problems.
- 3) Encourage problem solving and persistence in solving the problem.

Attachments:

Extensions And Modifications

Students that do well can also program the BeeBot to pause at the flower and then return to the hive.

For students having difficulties, reduce the size of their course and/or the block in the middle.

Attachments:

Material or Resources

Material and Resources

One BeeBot for each pair of students. Extra AA batteries.

One 12 inch wooden block or other similar barrier for each team.

One laminated hive (can be taped to the floor) and one laminated flower picture attached to a block.

Worksheets (attached elsewhere.)

Attachments:

Websites

References