

Square Dancing: Drawing Shapes with Bee-Bot

30 minutes**Exploring Robotics and Commands**

WHAT THIS LESSON DOES

In this lesson, you'll guide your students in understanding directional commands and spatial awareness through programming Bee-Bots to move in square shapes. They'll play a game, draw squares, trace numbers, and work in groups to program Bee-Bots. This will enhance their sequencing, problem-solving, and collaborative skills, setting a strong foundation for advanced coding concepts.

WHAT STUDENTS SHOULD BE ABLE TO DO

- Develop understanding of sequencing and spatial awareness through programming Bee-Bots to move in square shapes.
- Enhance precision and planning skills in programming by creating both small and large squares.
- Improve problem-solving abilities by adjusting the number of forward steps between each turn to create larger squares.
- Strengthen collaborative skills through group work in programming Bee-Bots.
- Build a strong foundation in logical thinking and programming for more advanced coding concepts in the future.

BEFORE THE LESSON

- Charge Bee-Bots and check each one responds to forward and turn commands.
- Set out one Bee-Bot, one grid mat, and a whiteboard with markers per small group.
- Open the square-drawing interactive on the class screen and test it before pupils arrive.
- Clear floor space so a pupil Bee-Bot can walk a short path to a visible target.

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HOW THE LESSON RUNS

Introduction

Students as Bee-Bots

Drawing a Square

Tracing Numbers with our Beebots

Moving Bee-Bots in Squares

Wrap Up

TEACHING MOVES

- 2. Students as Bee-Bots. Pick a pupil Bee-Bot and a clear target. Have the leader give one command at a time. Pause after each move so the class can judge whether the next command is still on course.
- 3. Drawing a Square. Name the two rules aloud: four equal sides and a 90-degree turn at every corner. Ask pupils what goes wrong if a turn is missed or sides are different lengths.
- 4. Tracing Numbers with our Beebots. On the interactive, enter forward, turn, forward, turn through all four sides. Then ask how to grow the square: keep the turns, only add more forward steps between them.
- 5. Moving Bee-Bots in Squares. Groups write the full sequence on the whiteboard before touching the Bee-Bot. Test the small square first. Only then add forward steps to make a larger square on the same grid.
- 6. Wrap Up. Ask groups what changed between their small and large sequences, and which single command error broke a square most often.

WHAT TO WATCH FOR

- Pupils turn only once or twice and expect a square to appear. Count the corners together on the mat: four sides means four turns. Have them tick each turn on the whiteboard as they enter it.
- Pupils change the turn angle or mix left and right when trying to make a bigger square. Freeze the turn rule: same 90-degree turn each corner. Only the number of forwards between turns may change.
- Pupils add forwards but forget to keep side lengths equal, so the path drifts. Ask them to write the same forward count on all four sides before they press Go, then watch whether the Bee-Bot closes the shape.

DIFFERENTIATION

- Emerging: Let them act the path on the grid with a finger before entering buttons. Give a starter sequence with two sides filled in so they only complete the remaining turns and forwards.
- Developing: Have them tick each command on the whiteboard as it is entered so nothing is skipped. After a failed run, ask which side went wrong before they clear and retry.
- Proficient: Challenge them to build a still larger square by increasing forwards only. Ask them to reverse the turn direction and check the shape still closes.