

Learning with Loti-Bot: Mathematics

Shape

- Program Loti-Bot to draw a range of 2D shapes to a high level of accuracy.
- Discuss the properties of shapes and use Loti to solve a variety of shape related problems.
- Symmetry – use Loti-Bot's drawing ability to explore tessellation, repeated symmetry, repeated patterns, etc.

Multiplication and Division

- Pupils can create programs that involve repeated addition or subtraction, reinforcing multiplication and division concepts. For example, they can program Loti-Bot to move forward a certain distance, turn, and repeat the process several times to simulate multiplication.

Position and Direction:

- Use Loti-Bot's movement and sensors to explore concepts of position and location on a grid. Children can program Loti to move to specific coordinates, teaching them about Cartesian coordinates.
- Program Loti-Bot to make whole, half, quarter and three-quarter turns, exploring how the turns relate to angles and directions.
- Create a program for Loti-Bot using the compass.

Angles

- Explore angles by programming Loti-Bot to make different degree turns (e.g. 45° , 90° etc) and observing which way it turns. Take learning further by investigating the different angles in shapes.

Length and Distance

- Program Loti-Bot to move specific distances using its motorised movement and ultrasonic distance sensors. This helps children to understand measurement concepts and units, such as centimetres and meters.
- Get children to estimate how long the distance is from one point to the other. Program Loti to move the distance estimated. Did Loti complete the distance?

Patterns and Sequences

- Program Loti-Bot to follow specific patterns and sequences of movement. For example, they can create a program that makes the robot move in a repeating pattern to reinforce the concept of sequences and patterns in mathematics. This can be further supported when using the pen feature in

Area and Perimeter

- Explore area and perimeter by programming Loti to move and measure the sides of geometric shapes on the floor.
- Program Loti-Bot to draw shapes with different requirements of area or perimeter.

More ideas for using Loti-Bot to support mathematics learning can be found in the Big Bag of Numeracy Loti-Bot Kit.



Learning with Loti-Bot: Science and Geography

Science



Use Loti-Bot's sensor and data logging tools to collect and analyse data.

- **Plants** – explore the impact of temperature and light on plant growth.
- **Light and Shadows** – collect data to show the relationship between light intensity and the size of a shadow cast.
- **Forces** – explore how Loti's movement changes when it pushes different objects on a range of different surface types. Use the different speed settings and a stopwatch to record how different surface types affect the speed of objects.
- **Sound** – use Loti's microphone to measure the loudness of sounds in different locations. Investigate how distance affects sound levels by moving Loti closer and further away from a sound source.
- **Time and Speed** – time how long it takes Loti to move a certain distance and calculate its speed. This can be expanded as Loti-Bot has three programmable speeds.

Geography



Direction and Movement

- Pupils can learn about basic concepts of direction (e.g., forward, backward, left, right) and movement as they program the robot to navigate a specific path or reach a target. This helps them understand the relationship between commands and physical movement.

Position and Location

- Using floor robots, pupils can explore the concepts of position and location by programming the robot to move to specific locations on a grid or map. They can also learn about coordinates and grid referencing.
- Use Loti-Bot to explore compass points through giving children cardinal directions for programming Loti to move across a map, e.g. 'Program Loti to move 20cm North, which country does Loti end up in?'

Learning with Loti-Bot: Art and Creativity



Drawing

- Create unique pieces of artwork by programming Loti-Bot to draw different shapes and patterns.
- You could for example create artwork with tessellation, rotational symmetry or featuring different shapes.
- You can change the pen colour for different shapes to add extra dimensions or change the distance Loti travels to create small or large scale masterpieces!

Interactive Theatre

- Use Loti Bot to create immersive and interactive theatre experiences where audience members can influence the outcome of the performance through their interactions with the robot.
- Why not use Loti-Bot to generate sound effects in real-time. It can be programmed to produce a wide range of sounds to enhance live performances or videos.

Storytelling

- Use Loti-Bot as a character or narrator in a storytelling performance. Its ability to move, create sound and use lights can bring stories to life in a captivating way.

Interactive Art and Light Shows

- Loti-Bot's lights can be programmed to create interactive art displays. For example, Loti-Bot could respond to sound or movement by changing light patterns or colours.
- Synchronise Loti Bot's lights with music or other performances to create dynamic light shows. This can be used in concerts, dance performances, and other live events.

Collaborative Art

- Multiple robots can be used in a collaborative art project. They can work together to create synchronised and coordinated visual and auditory experiences.

Colour

- Pupils can experiment with different colour combinations and mediums, incorporating LED lights to add visual effects to their art.
- The RGB values of Loti-Bot's sidelights can

Dance and Movement

- Incorporate Loti Bot's motorised movement into dance routines or choreography. Pupils can create performances that blend human and robotic movement, adding a unique element to dance and theatre productions.

Kinetic Sculptures

- Loti-Bot's ability to move and create art can be used to design kinetic sculptures. Students can experiment with creating moving art pieces that incorporate both visual and auditory elements.

Music and Sound Composition

- Use Loti Bot's speaker to compose and play music. Children can program the robot to produce musical notes and rhythms, allowing them to experiment with sound composition and music theory.