

BETI

RoboGraphs

Scenario title/name of the game: RoboGraphs

Children’s age (primary school students):6-7 years old

The time needed:45-60 minutes

Content/Subject: graphs

Aim of the activity:teach students how to understand, build, and interpret different types of graphs.

# Introduction

"Exploring Different Graphs with robots" is a game designed for primary school children to learn about different types of graphs using the robot. The game aims to introduce children to the basic concepts of graphs and data visualization, as well as teach them how to program the robot to navigate different graphs.

In the game, the teacher sets up several different types of graphs on the classroom floor using masking tape or string, such as bar graphs, line graphs, pie charts, and scatter plots. The children are then divided into small groups, and each group is given a robot and a set of cards with different data points to represent on the graphs.

The groups take turns programming their robot to move along the graphs to the correct data points using the cards as a guide. As the robot moves along the graph, the children can observe how the different graphs represent the data in different ways. For example, they might notice how a line graph shows the data points connected by a line, while a bar graph uses columns to represent the data.

Once all the groups have completed their graphs, the teacher can lead a discussion with the children about the different types of graphs and how they represent data differently. The children can also share their observations and insights about the graphs and how they were able to program the robot to navigate them.

Overall, RoboGraphs is a fun and interactive way for children to learn about graphs and data visualization, while also developing their programming and critical thinking skills.

## Resources:

Programmable robot: The robot is a small and programmable robot that moves in different directions and distances. It is an essential tool for the game as it helps children understand the concept of graphs and their different components.

Graph paper: Graph paper is used to create different types of graphs for children to explore. The paper should be of good quality to avoid tearing or damaging easily.

Markers: Markers are used to draw different types of graphs on graph paper or you can print some fruit images

Cards: Cards can be used to create a game where children can match different graphs to their corresponding descriptions.

Maze: a maze will work as a place for collecting goods that should be marked in the graphs. The paper should be of good quality to avoid tearing or damaging easily.

Whiteboard or blackboard: A whiteboard or blackboard can be used to display different types of graphs and explain their components to the children.

Accessories: Accessories such as obstacles, toy cars, and other small items can be used to create a more interactive and engaging game; Include treasure cards, fruit cards, and other necessary equipment.

# A detailed description of the scenario

Line Graphs: The first graph robot encounters is a line graph. The teacher shows the class a line graph and explains how it works. Then, the teacher will present the robot and will explain the story of how it had a different number of apples on different days. For example: on Monday, the robot bought 5 apples. Children then have to take the robot and program it to go through the maze and collect as many apples as the teacher said it bought. After, children place apples on a scale of 5 for the first day. The teacher continues the story with “On Tuesday, the robot ate 4 apples and gave 2 to a friend. How many are left?”. Then children take as many apples as left and put them on for the second day on the scale. The teacher continues the story with the days, depending on how big the chart is and children keep collecting apples from the maze when needed (either the robot bought it or someone gave them more apples) and place it on the scale. At the end the line graph is present and the teacher asks questions, like when the robot had the lowest number of apples. When is the highest? etc.

Bar Graphs: The next graph robot encounters is a bar graph. The teacher shows the class a bar graph and explains how it works. Then, the teacher gives the task of collecting and counting all the numbers of apples, oranges, bananas, avocados, watermelons, and lemons in the maze. The class will program the robot to move to each fruit and collect it one by one.  Then sort them into groups and present the information in a bar graph. Then the teacher asks questions, like “The biggest share of all fruits takes…?”, “What is the difference between lemons and apples?”, etc.

Conclusion: After the robot has explored all the different graphs, the teacher will lead a discussion about what they have learned. The class will discuss the different types of graphs they encountered and how they are used. The teacher will reinforce the concept of graphing and plotting and how it helps us organize and understand information better.

Outcomes: Through this game, the children will learn about different types of graphs and how they are used to represent data. They will also develop problem-solving skills and improve their programming skills by programming the robot to navigate through the graphs.

# Steps

1. Introduce the concept of graphs to the students and discuss the different types of graphs they may have seen before (e.g. bar graphs, line graphs, pie charts, etc.).
2. Show them examples of each type of graph and explain what information they can convey.
3. Introduce them to the robot.
4. Tell the story and start explaining tasks one by one.
5. Conclude the lesson by summarizing the different types of graphs and their use.

# Tips and tricks for the teacher

Start by introducing the different types of graphs to your students. You can use visual aids like charts or diagrams to help them understand the differences between a line graph, bar graph, and pie chart.

Allow your students to experiment with the robot and practice moving along the grid. Encourage them to use the buttons to program different paths and explore.

Once your students are comfortable with the basics of using the robot, you can introduce them to more complex graphs. Provide them with a variety of graphs on ppt or printed versions, discuss all of them.

Incorporate different subject areas into your graphing lessons. For example, you can create a graph that represents the number of animals in a zoo, the temperature over a week, or the number of books read by each student in the class. This will help your students see the practical applications of graphing in real-world scenarios.

Encourage your students to work in pairs or small groups to complete the graphing activities. This will give them an opportunity to collaborate and problem-solve together.

As your students become more proficient in using the robot to explore different graphs, you can introduce more advanced graphing concepts like slope, intercepts, and trends.

Make the lessons fun and engaging by incorporating games or competitions into your activities. For example, you can challenge students to program the robot to create the tallest bar graph or the longest line graph.