Ozobot Color Code Riddles

1. Name of the project:

Ozobot Color Code Riddles

This task should encourage students to get to solve path riddles with the Ozobot. The students get to think about the different options of solving the riddle and afterwards need to color the specific boxes to communicate to the robot. The students get to know the robot and general functionalities of such robots. The riddles can also train the students in for example spatial imagination depending on the specific task. The students get an A4 Paper with the riddle, in which they need to color the blank boxes along the way they think the Ozobot should take. The riddles can be more complex like “Use every route without using a path more than once” or they could be easier like “Get to location xy”. With their solution complete the Ozobot can get involved. The Ozobot is the indication of whether the task was correctly solved or not.

2. Subjects covered from STEAM areas:

Computer Science
Arts (specific forms)
Maths (Coding via Ozoblockly; Using Codes to count points)

3. Target group (age range and size of the group):

Grades 5/6

4. Duration of the activity:

2 lessons (2*45 min)

5. Key words:

color coding (first easy programming experience)
solving problems
communication and working together
autonomous driving
Epistemic Programming

6. Key sentence describing context of the activity, followed by short description (200 words):

The project can serve as an introduction to the colour coding of Ozobots, and can be used, for example, as an introduction to a series of lessons on learning the basics of programming.
The students start by getting to know the Ozobot through its colour coding. They make their first experiences with the use of a limited selection of clearly defined commands

that have to be used at certain points to solve a problem. They find out that the Ozobot does no more and no less than what they tell it to do with the colour codes. In addition, they are asked to think themselves spatially into the Ozobot's point of view. Autonomous driving, which is carried out by the Ozobot in a highly simplified form, can be used as a context here.

7. Description of the activity environment, including the list of materials and tools needed:

- Group tables so that students can work together in small groups;
- Screen and beamer or smartboard to compare solutions;
- Enough printouts of the puzzles/maze for all groups; Ozobots cards with the different colour codes that can be placed on the puzzles (better correction of mistakes in contrast to drawing with pens).

8. Step by step, detailed description of the activity, including teaching and learning strategies:

Lesson introduction based on the topic of "autonomous driving”

- What must a self-driving car be able to do to reach its destination?
    - Turning and driving straight ahead
    - Drive faster or slower depending on the specification
    - Change lane
- Collecting ideas on the board

Getting to know the Ozobots

- The pupils get together in small groups and are given a drawing of paths in which colour codes have already been entered.
- they should note which code does what
- Further on, they can draw a path on their own and mark it with colour codes (free task to get to know the bot).
- Compare the codes found in plenary, create a table with the meanings of the individual codes (backup, for use in the further progression of the lesson).

Working through various puzzles (problem solving) with the Ozobot

- Challenge given in the form of a target to be reached and an illustration of the "lanes".
    - reach a specific goal
    - Keep to a certain time limit (go faster or slower).
    - Turn a certain number of times (Ozobot has counting functions, also in colour code mode).
- Solving the puzzles in small groups
    - Initially with code cards so that the code can be easily changed if mistakes are made

    - When the solution has been found, draw it on the labyrinth as a backup
    - Compare the solutions in the plenary session

Collecting difficulties and peculiarities that had to be taken into account when solving the puzzles (plenary, discussion)

- E.g. putting oneself in the Ozobot's place (when it drives towards me, its right is not my right)
- The Ozobot is "stupid" and really only does what it reads out from the colour codes, it cannot contribute to solving the puzzle on its own

What does this mean for autonomous driving? (plenary, discussion)

- The car does not make its own decisions
- Every possible situation has to be more or less taught to the car

9. Learning objectives/competencies:

problem solving and modelling

- principles of the digital world
- recognising algorithms
- modelling and programming

Introduction to the basics of programming

Recognising that technical devices only do what they are told, no more and no less

10. Evaluation/Assessment guidelines:

Correctness of the solutions to the individual puzzles

Collaboration in the small group phases

Collaboration in the plenary phases

11. Lessons learned:

I found the overview of the different teaching approaches to STEM/STEAM particularly interesting, as you get an overview of a whole range of exciting teaching ideas that can be translated relatively easily into a lesson and with which you can offer students contexts that cover several subject areas. In this way, you can get away a little from the idea that each subject "does its own thing" and the students see that there are indeed connections between mathematics, computer science, natural sciences, technology and sometimes even arts.

12. Additional information/Links:

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13. Contact person:

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