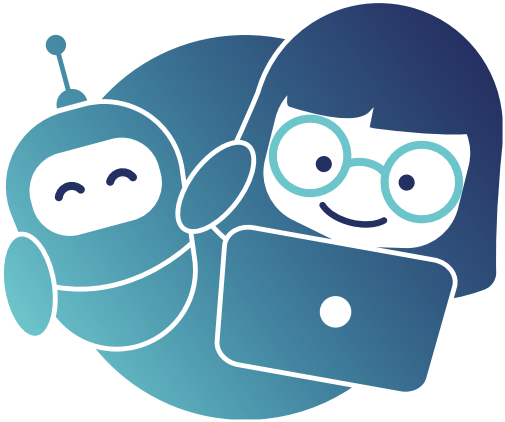
6

I'm not a Robot



Toolbox #6

What does a robot eat

6

Introduction

What is this about?

With the question „What does a robot eat?“, on the one hand, the process of energy assimilation is addressed, but on the other hand, data collection and processing can also be meant.

Focus Energy demand
In this context, children can learn about different forms of energy and how they are produced and processed. They can develop hypotheses about how and where energy (as a physical quantity) is involved and how it is generated. Here is also the possibility of linking to the topic of sustainability and environmental protection.

Focus Information demand
Another possible answer can be: „He eats data“. In this case, the educators can choose materials that focuses on private and sensitive data and involve the children in thinking about identity and privacy.

Children‘s point of view

Questions from Children

What does a robot eat when it is hungry?
And how often does it have to eat?
Do all robots need electricity?
Can a robot recharge itself?
What does a robot do when it is charged with energy?
What does a robot do when it reads, processes and reveals data?
What else does a robot need to work?

6 What we know

Focus Energy demand

Energy has many forms. If we rub our cold hands together firmly in winter, they become warm again (muscular heat energy). If I throw a ball filled with air against the wall (kinetic energy), it deforms (elastic deformation energy) and bounces back to me (kinetic energy). An engine burns a mixture of petrol and air to run (combustion energy kinetic energy). When people or animals are hungry, they eat something and, in the process, convert chemical energy into body heat, muscle power or thinking power. We also know that robots or AI-controlled devices need to be switched on in order to function. If timers are used, the robots start automatically at the programmed time. There are robots that run on battery power, others on electricity or solar power. What actually happens to the energy when the robot is charged or an AI-powered device is powered? The robot vacuum collects the crumbs from the floor and the computer processes data. While one process can still be traced by observation, the other remains hidden from the observer. Only the results of the energy conversion as well as the data processing can be perceived again.

Focus Information demand

Presumably children have already observed an adult person surfing the internet and noticed that he or she swears about unwanted advertisements. „Again, the advertisement for the mountain boots I bought four weeks ago"; it becomes obvious that activities on the internet leave traces that are mirrored to us by targeted advertisements. This is annoying for some and seductive for others. So, the internet is not only there for users to find things, but also for producers to push their services and goods into the focus of our attention. In the worst case, a stranger uses information from us to harm us.

6

Goals

Pedagogical professionals

Technical competences
Knowledge about the energy forms and electric circuits

Technical competences
Knowledge about data collection, data processing and data protection

Didactic competences
Reflecting on different pedagogical methods in the context of promoting knowledge about robots and AI

Didactic competences
Training differentiated observation skills

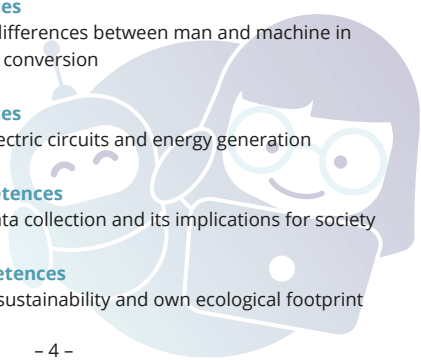
Children

Technical competences
Understanding the differences between man and machine in energy demand and conversion

Technical competences
Understanding of electric circuits and energy generation

Informational competences
Understanding of data collection and its implications for society

Metacognitive competences
Reflective ability on sustainability and own ecological footprint



6

Exercise

Level

How many bowls do we need?

Materials

Camera
Picture Puzzle

Preparation

No special preparations needed

Implementation

- Meet with children in the morning circle and begin it as usual. After questions about the day of the week, the month etc. ask them about who of them would like to be the table service on that day.
- Ask them, what do they have to know, when it's going about the meal of the day; the possible answers would be: today we are going to eat soup so we need bowls and spoons. But before they prepare the tables, they have to know how many bowls and spoons they need. To know get information about it, they have to know the number of the children in the group on that day.

Reflection

Children learn to plan activities by first gathering specific information and then carrying out the action based on the data. In our case, we first need to know what the main meal is that day, what kind of dishes we need and how many children are in kindergarten that day.

Tip

This could be a fix part of you morning circle routine

6

Exercise

Level

Sounds of vegetables

Materials

Notebook/laptop with speakers, or tablet with corresponding cable and Wi-Fi connection
Makey Makey kit

Web-based application
scratch.mit.edu

Various vegetables/fruits

Preparation

This activity can be carried out in small groups (six children, age five plus). The other children in the group can observe the action, later of course they take turns.

Please don't eat the vegetables after using them in this experiment, because the process produces toxic substances! The vegetables must be discarded immediately after the experiment!

Implementation

- Discuss the different materials together with the children and present them briefly. The web-based application Scratch is opened. The application can be used with and without account.
- Next, the "Develop" field is selected. The tutorial can be closed for this application.
- Under the globe, the language of the application can be change if required.
- Select the block "When space key is pressed" under Events and drag and drop it into the programming interface.
- Next, under Sound, the block "Play sound Miau" is selected. This block is dragged under the block "When space key is pressed". These connect like pieces of a jigsaw puzzle. This procedure is now repeated four times, so that in the

6 Exercise

Level

end there are five such small programming blocks. With four programming blocks, clicking on the space key intem in the "When space key is pressed" block now always select a different function of the keyboard (↓ ↑ ← →).

- In the menu under the tab "Sound", four additional sounds can be added in the lower area (speaker). After adding, the system switches back to the Skripe tab.
- In the block "Play sound Miau", the corresponding sound for the respective key is now selected by clicking on the point Miau.
- Connect the Makey Makey circuit board to the notebook (via USB). Connect one end of the crocodile clips to the Makey Makey (arrows and space). These later replace the keyboard of the notebook.
- A crocodile clip is connected to one end as earth. The other ends of the crocodile clis can be inserted into five different pieces of vegetables.
- One child holds the other end of the crocodile clip, which is connected to the earth. Now this child can make different sounds by touching the pieces of vegetables.

Reflection

- Reflect the meaning of different building elements and the structure of a simple electrical circuit.
- Which meaning have those elements and the electrical circuit for the robots?
- What would be "healthier" for a robot: electrical circuit or vegetables which were used in the activity?
- Was the programming with Blockly necessary for our activity?
- How can we get more different sounds?
- Can our body be a music instrument too?

Variation

- The vegetable pieces can, for instance, also be replaced by flowers which are lying in water.

6

Tips for in-depths study

Literature

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by Linda Liukas, 2019

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by Linda Liukas, 2019

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