Planet Pi

The Pi has code programming.

The Planet Pi contains 223 interactive activities that introduce children to the world of programming and coding in a friendly way. Activities are divided into levels of difficulty so that even preschool users can catch the IT bug. The package, by learning the basics of programming, stimulates the improvement of skills in many other areas. It teaches logical thinking and problem solving (computational thinking, cause and effect thinking). It activates the imagination and creativity. It shapes character through training perseverance, patience and consequences in finding solutions. It equips children with the necessary competences of the future.

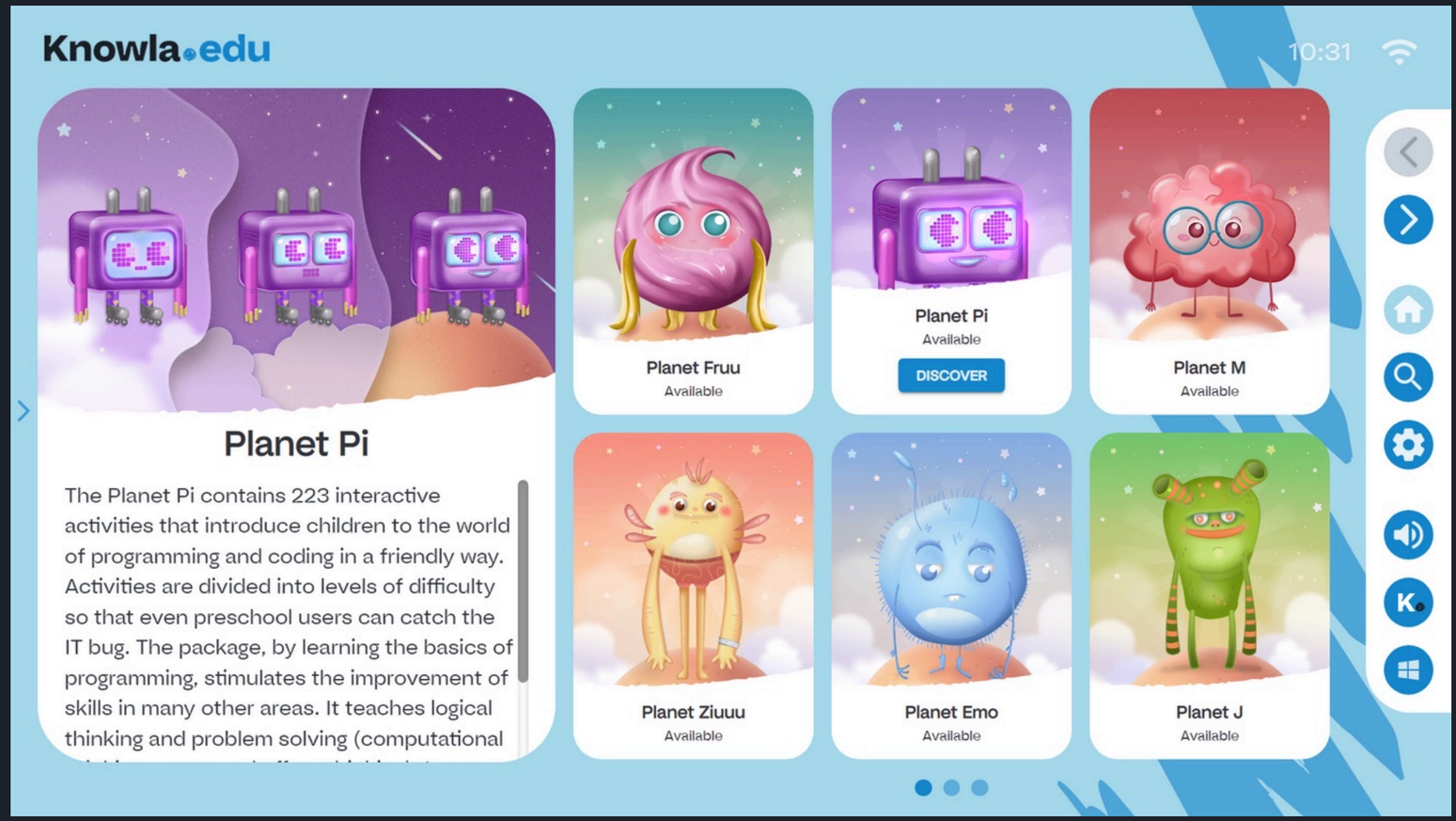
Knowla

Knowla's apps are dedicated to children from the age of 3.

The Planet Pi apps include difficulty levels:

- level 1: 3 - 4 years,
- level 2: 5 - 6 years
- level 3: 7 - 9 years
- level 4: 10+

Planet Pi in the Educational Universe



Knowla.

System buttons and menu view

Knowla

Main menu - legend

return to all planets view

previous planets/apps/activities

more planets/apps/activities

move to the application search engine

go to launcher settings: language selection, license code activation, service settings

sound on/off (turning off the sound at the planet/application selection level will turn off the sound in any subsequent active activity; turning off the sound in an activity will only be active when playing in a given activity)

move to select Knowla.fun or Knowla.edu mode

switch to windows desktop view; the application will remain active in the taskbar all the time

Menu icons in activities - legend

exiting the activity to the launcher view (application selection); any changes made will be lost

reload activity; any changes made will be lost

sound on/off

background change

exit to activity selection list, any changes will be lost

previous board

next board

interactive activity guide

Successful activity

Activity failed

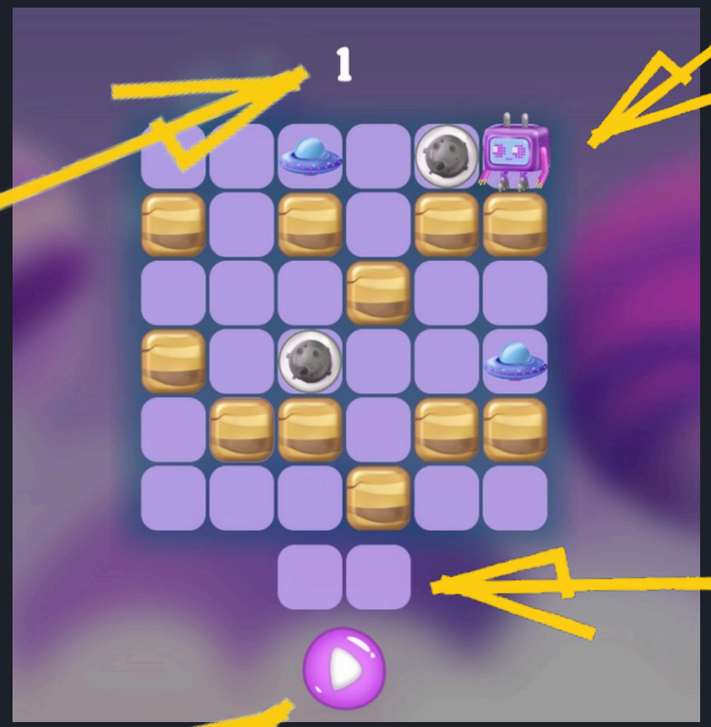
Activity list
with quantity or time

The Planet Pi includes 3 apps with 223 activities:

1. Space Odyssey - 5 levels, 162 activities
2. Color code - 2 levels, 23 activities
3. Code with patterns - 38 activities

A space odyssey

Legend:



activity number

action board

items to set

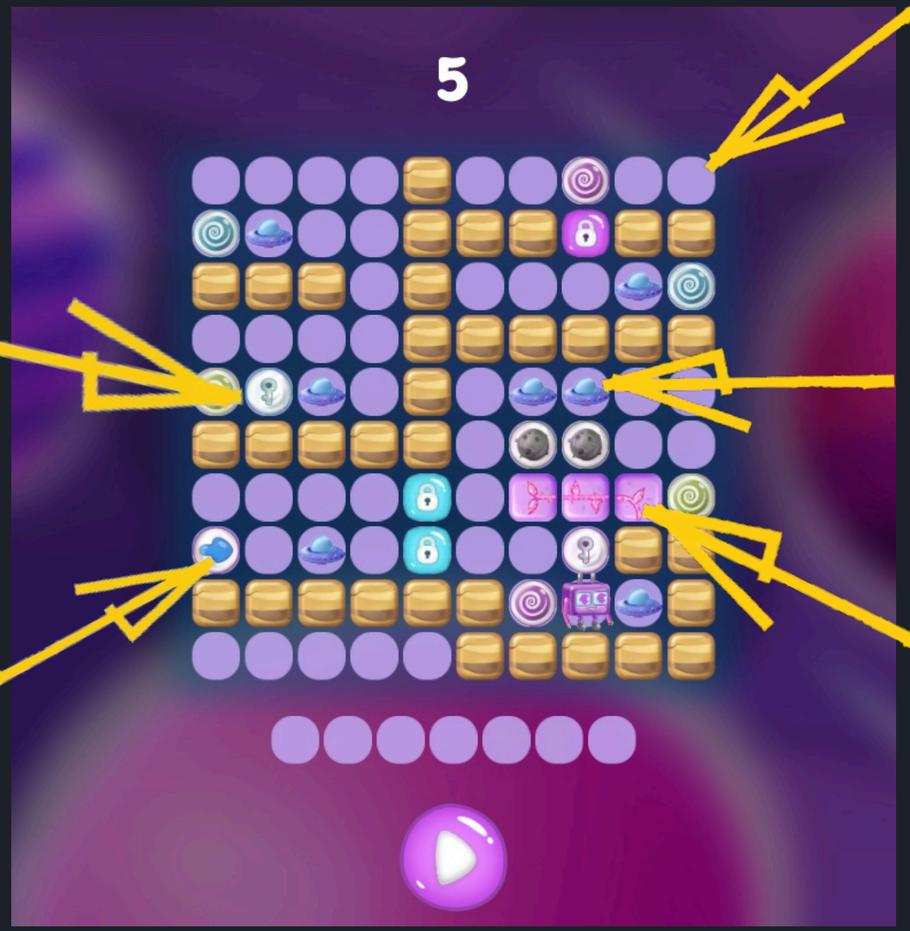
checking the correctness of the task

A space odyssey

Elements I:

Key (different colors) - If the creature goes through the key, it will open the padlock of the same color. Drops to lower levels if there are empty spaces below it.

Arrows - if the creature passes through them, its direction will change to the one indicated on the arrow, and the arrow itself will disappear. A single press on the arrow rotates the arrow to the right or left. Drops to lower levels if there are empty spaces below it.



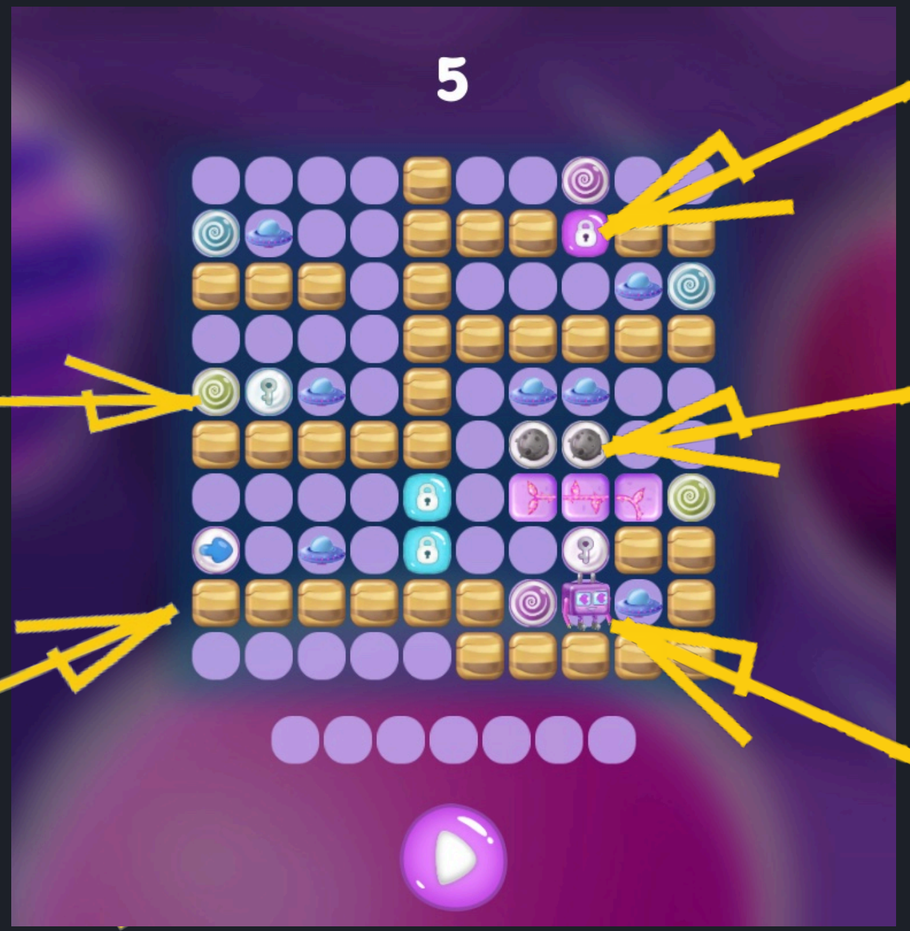
Empty field - a place where you can drop an item from the field of items to be set.

Spaceship - an element that Kreacher must collect during his journey. Drops to lower levels if there are empty spaces below it.

Plant and its finial - if the creature goes through the plant, it eats it (leaves an empty field in its place) and continues in the same direction. A plant needs a base on which to grow. If it disappears and there is an empty field, then the whole higher branch will also disappear (everything that grew above the empty field). If the plant has branches still attached to the substrate, they will remain after eating the upper layers. Any items placed on the plant and its upper legs that can fall will fall. It should be arranged according to the form of its growth.

A space odyssey

Elements II:



Padlock (different colors) - placed over an empty field, it will not fall below the board. When the creature passes through the key of the same color as the padlock, it opens and disappears. It leaves an empty field in its place. All items placed on it that can fall down after opening it will fall down. It acts like a rock until it opens.

Portal (different colors) - when the creature encounters a portal, it will move it to the place of another portal of the same color. After a single pass, the portal disappears, leaving an empty field. Drops to lower levels if there are empty spaces below it. Important: the creature will face the same way it is facing when passing through it.

Meteorite - A ball that the creature can roll across the board. All other elements standing in its way can block it from further movement. Drops to lower levels if there are empty spaces below it. It can also fall off the board.

Rock - Pixel most often moves on them. Placed above an empty field, it will not fall lower in the board. When the creature encounters them on its way, it does not pass through them and turns back.

Creature/Pixel - performs the route. A single press on the creature causes it to rotate to the right or left. Drops to lower levels if there are empty spaces below it. It can also go off the board, ending the activity with a failure.

A space odyssey

The task of the participant is to collect all the spaceships by Pixel. Below the board are the items that can be used to complete this task. Just drag them to the appropriate empty space on the board. Pieces already placed on the board cannot be changed. It is obligatory for a creature to appear on the board, while the remaining elements placed under the board can be used, but you don't have to use all of them. After placing the elements on the board once, you can change their position.
Unlike immutable pieces, they will flash on the board.
After placing the elements in the correct places, click play to start the animation. You can stop the animation at any time by pressing pause.
In this case, the set elements will remain in place. If the game is a success or failure, the participant can start over.

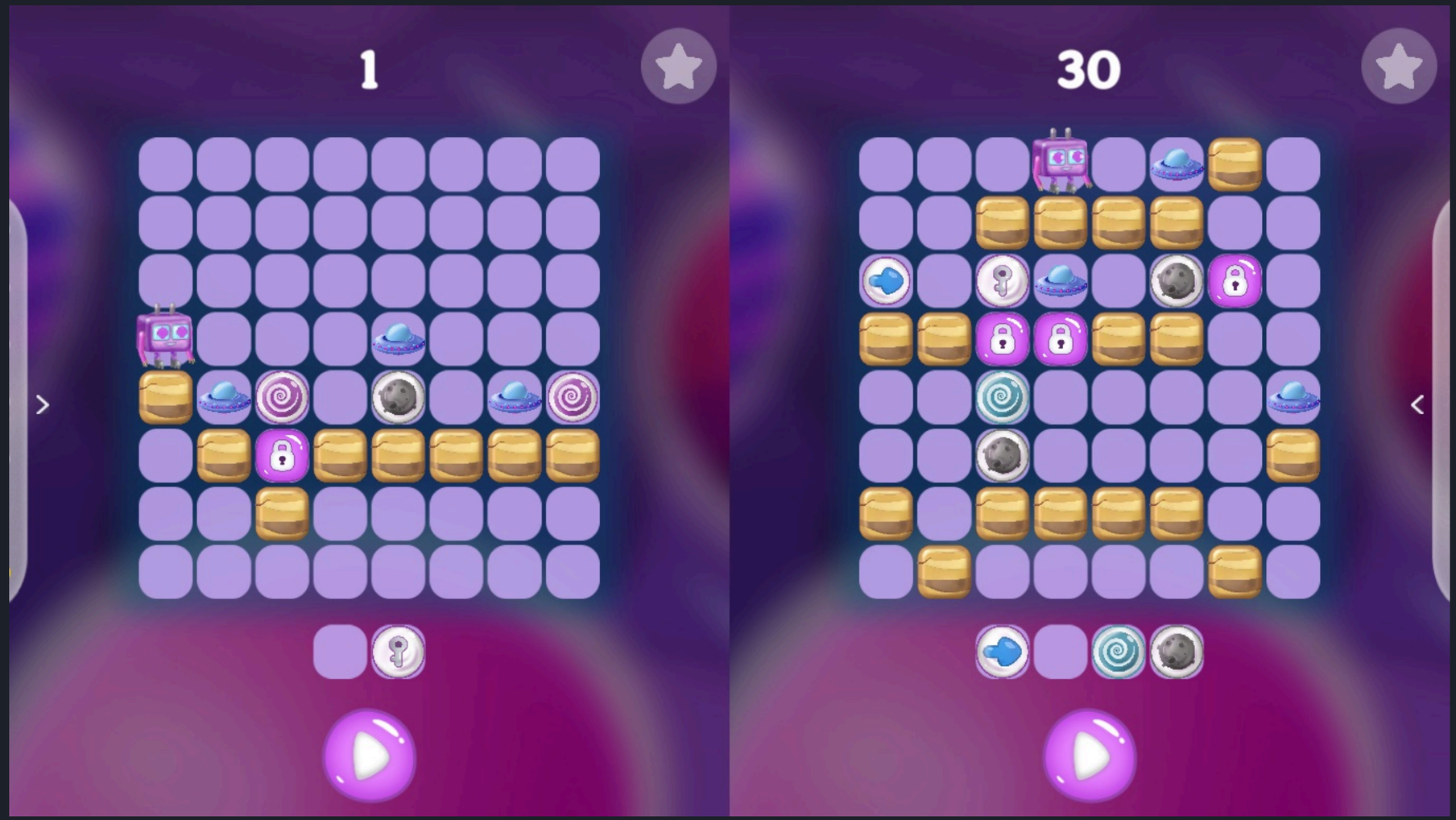
The creature, depending on the setting, moves right-left. When there is an empty field under it, it will fall to the lower level of the board. If not stopped by the set elements, it can also go outside the board, ending the activity.

The activity is successful when Pixel collects all the spaceships. A failure occurs when the creature goes off the board, i.e. it falls into an empty square on the lowest level of the board, or goes sideways when there are empty squares on the edges of the board, and the creature is not turned back first. There is also the possibility that he gets stuck, for example, between two rocks and will not have any other movement maneuver. In this case, stop the animation and reposition the elements.

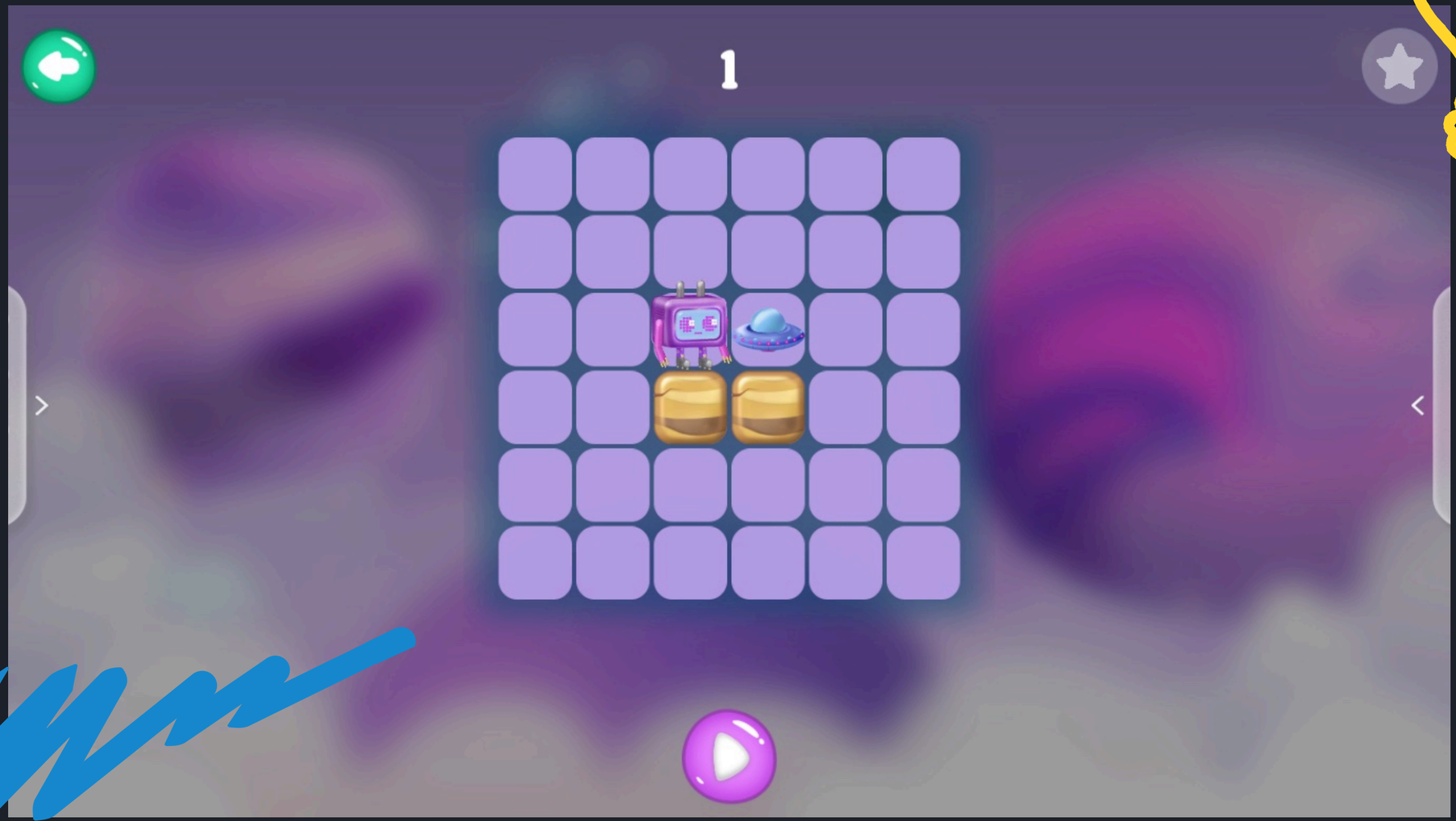
The levels differ in difficulty level.

Activity designed to work with pens.

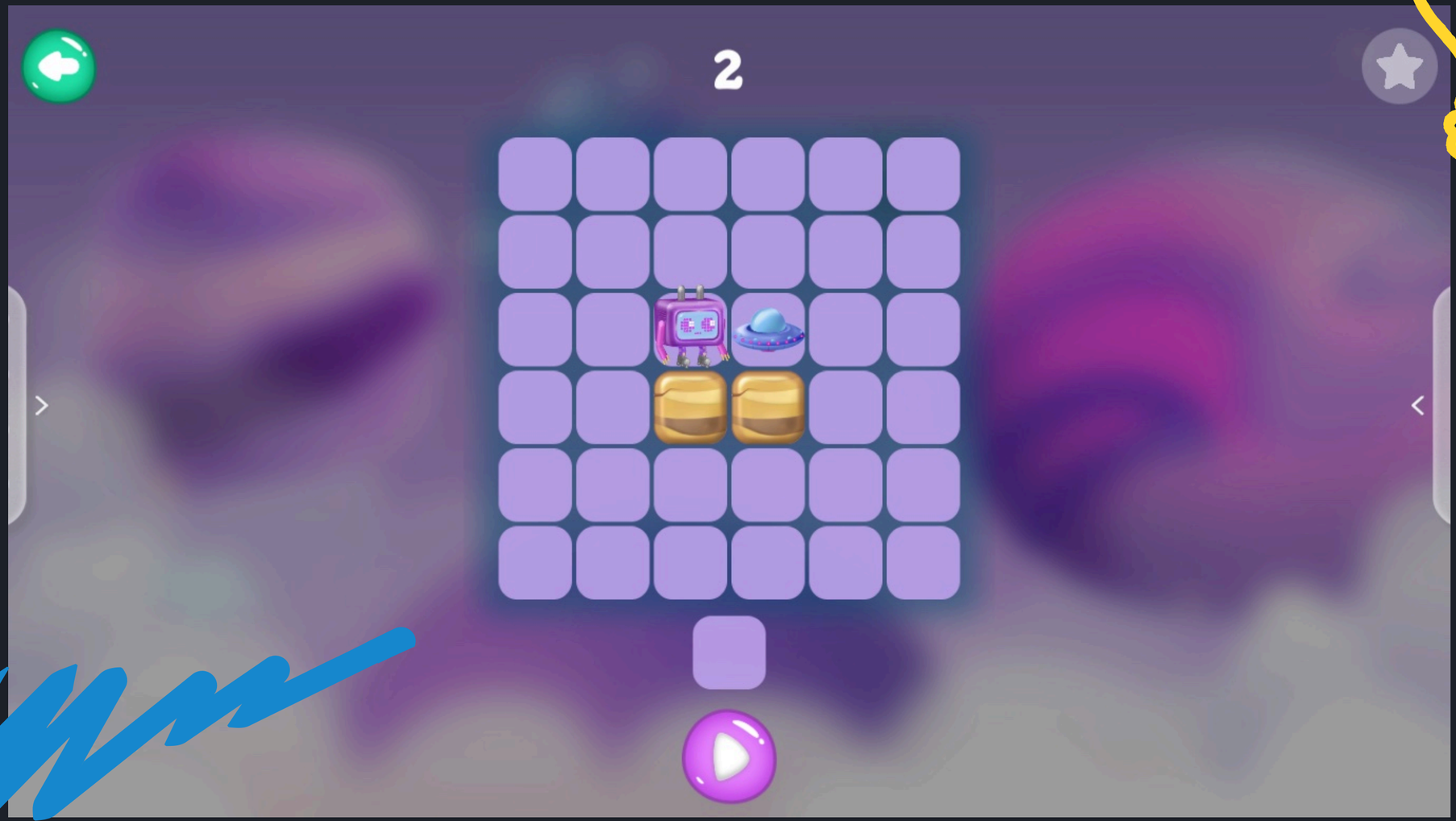
A space odyssey - 2-player mode view



Space Odyssey - correct solutions in the tutorial

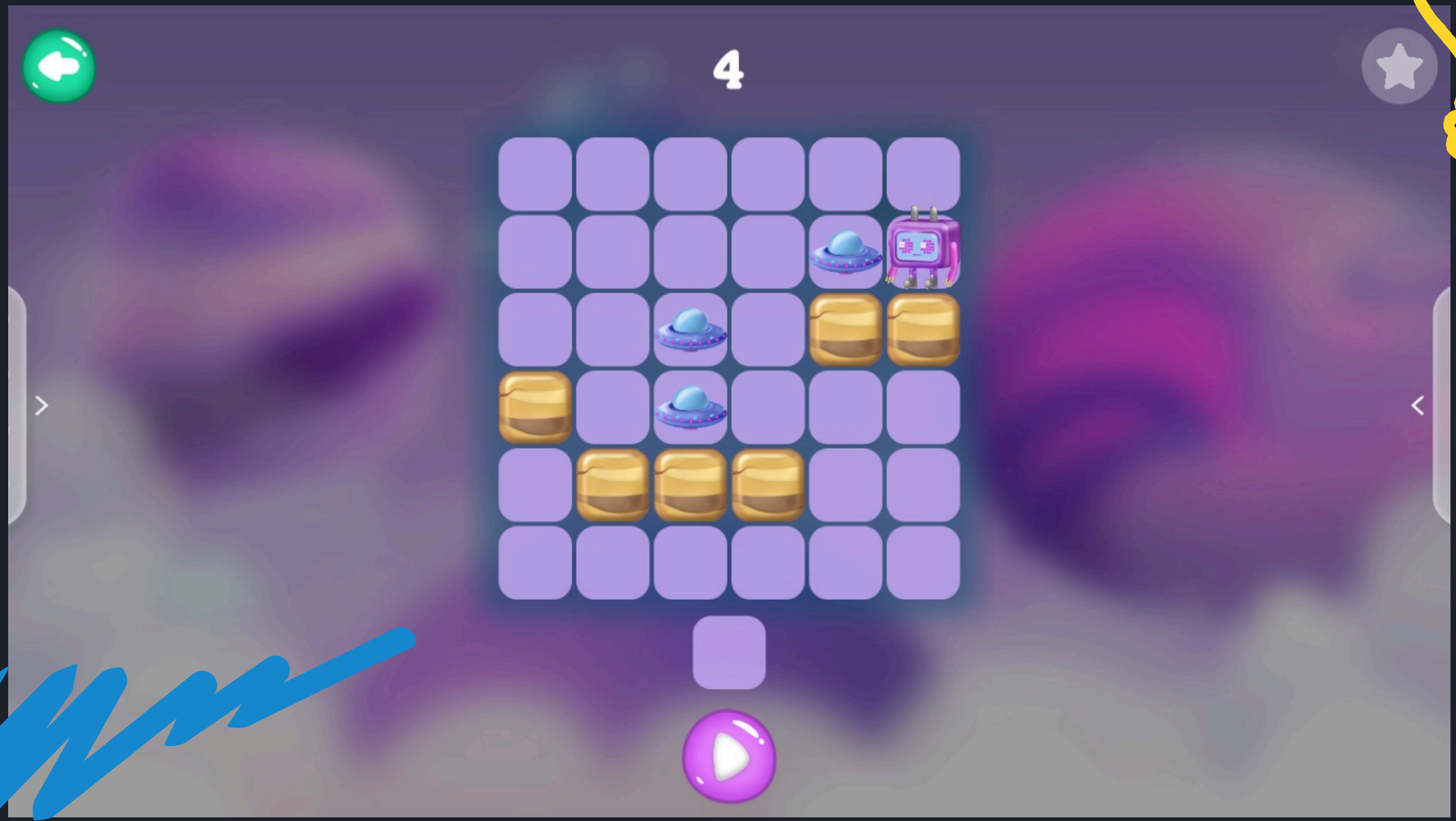


Space Odyssey - correct solutions in the tutorial



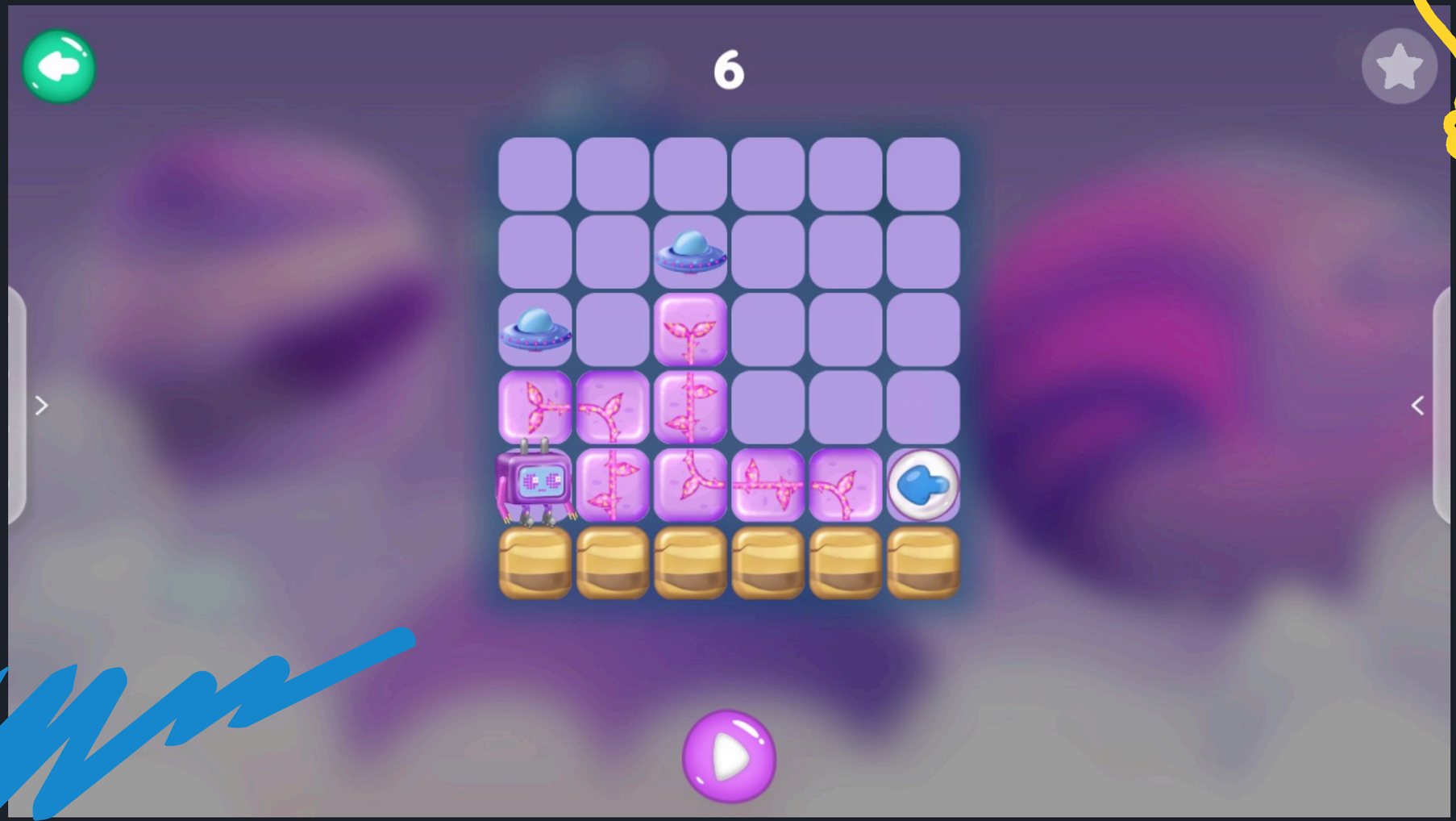
Space Odyssey - correct solutions in the tutorial

Space Odyssey - correct solutions in the tutorial



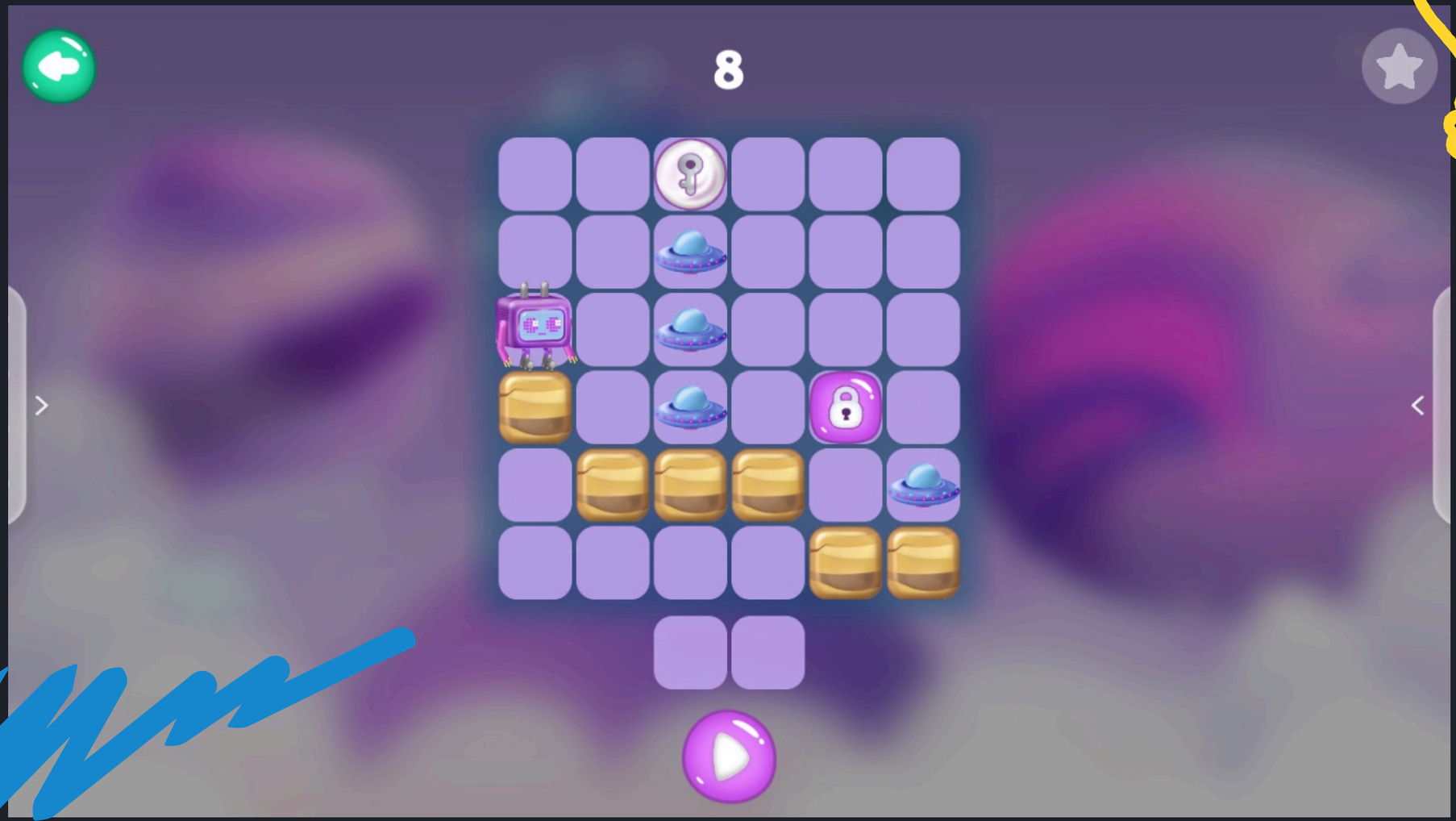
Space Odyssey - correct solutions in the tutorial

Space Odyssey - correct solutions in the tutorial



Space Odyssey - correct solutions in the tutorial

Space Odyssey - correct solutions in the tutorial



Space Odyssey - correct solutions in the tutorial

Space Odyssey - correct solutions in the tutorial

Space Odyssey - correct solutions in the tutorial

Space Odyssey - correct solutions in the tutorial

Space Odyssey - correct solutions in the tutorial

Space Odyssey - correct solutions in the tutorial

Space Odyssey - correct solutions in the tutorial

How does this relate to programming?

The activity uses several programming commands that are hidden to the eye. In turn, it provides a simple way to test children's cause-effect thinking or computational thinking. Some of the main programming commands used here are looping and implication. It also teaches the construction of algorithms, i.e. the creation of a specific sequence of steps to achieve a desired result.

The creature/Pixel moves within a loop in one direction continuously until it encounters an object that changes its behaviour. This is because a loop relies on repeated behaviour a certain number of times or until something happens to stop it. It will therefore be a mistake and the end of the activity if no event occurs to stop the creature/Pixel on the board, so the task then ends in failure.

Implication is used in most of the other elements that appear. It manifests itself with the formulation: ‘If something happens, something else happens’. Here are some examples of the implication used:
If the creature/Pixel enters all the keys on the board, the activity is successful.
If the creature/Pixel enters a key field, a padlock of the same colour as the key opens.
If the creature/Pixel enters a field with a portal, it will move to a second portal field of the same colour.

The activity can also consider variables that can be used in the activity. Variables will be all objects that can be substituted for blanks. Only the creature/Pixel will not be a variable, in the pure sense of the word. Rather, it is a visualisation of the action of the algorithm.

There is another point worth making as part of the activity. The same goal can be achieved using different algorithms (different settings of the elements). It may be that the difference is just moving the elements one empty box to the right or left, but it may also be a completely different way of doing things. It is worth bearing this in mind and assessing in terms of passing the activity, not the way it works. Instead, it is possible to discuss the efficiency of the algorithm.

Color code

It's a fun game of coloring by numbers. There is a picture on the board that needs to be decoded by filling in the fields with the appropriate colors listed in the legend. To select a color, press on it with the pens. Pressing the number on the board paints the field in the selected color, if it is compatible with a legend. When painting with subsequent colors, be careful, because if you hover over a field painted with a different color, a sad face will appear, and the field itself becomes unpainted again. The activity is successful when all fields are filled in correctly.

The levels differ in the size of the coloring board (12x12, 16x16 squares).

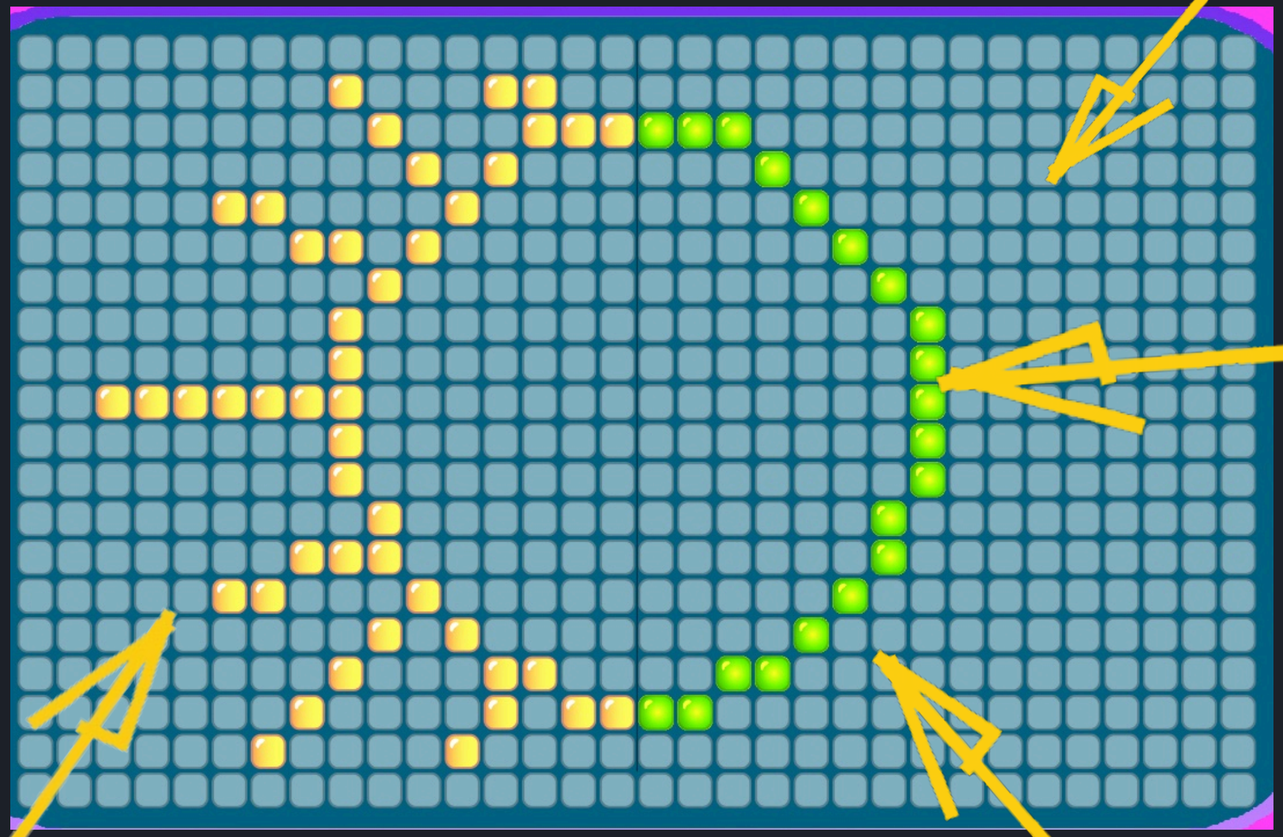
How does this relate to programming?

The activity consists in simple encoding and decoding, in this case a picture. It is based on one of the basic programming commands - the implication: "If x, then y". In this particular case, for example, it will be: "If I see a field with a one, I will paint it green." So it also teaches cause and effect. The above relationship also explains why in case of wrong selection with color, nothing happens or repaint the field in case of wrong selection again. Because only in one case is the implication false, when the first part of the sentence is true (e.g. "I see a field with a one"), but the second is incorrect (in this case, the action, when it is painted in the wrong color).

Activity designed to work with pens.

Code with patterns

Legend:



check boxes

correctly marked field

part to be reproduced

part of the action

Code with patterns

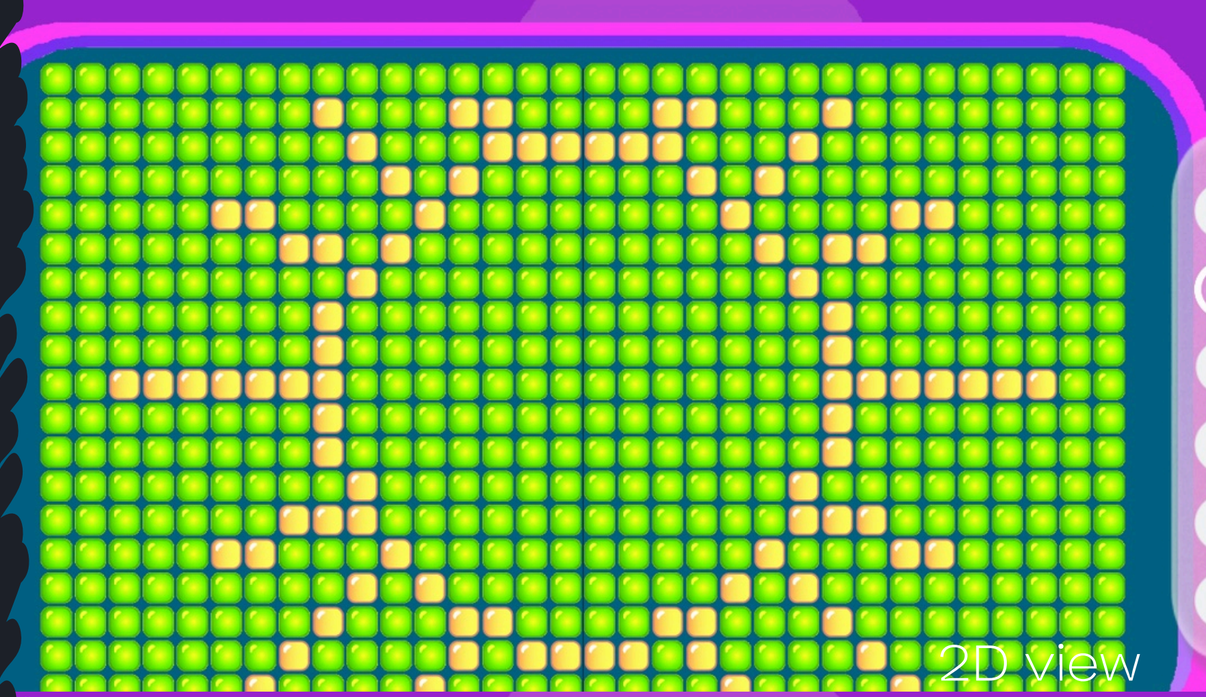
The task is to reflect symmetrically along the lines of the given formula on the part of the operation. You can activate them by pressing on the appropriate fields. If selected correctly, they will glow green, if incorrectly - red. Each field can be unclicked by tapping on it again. No action in the activity will make the correct pattern flash on the action part.

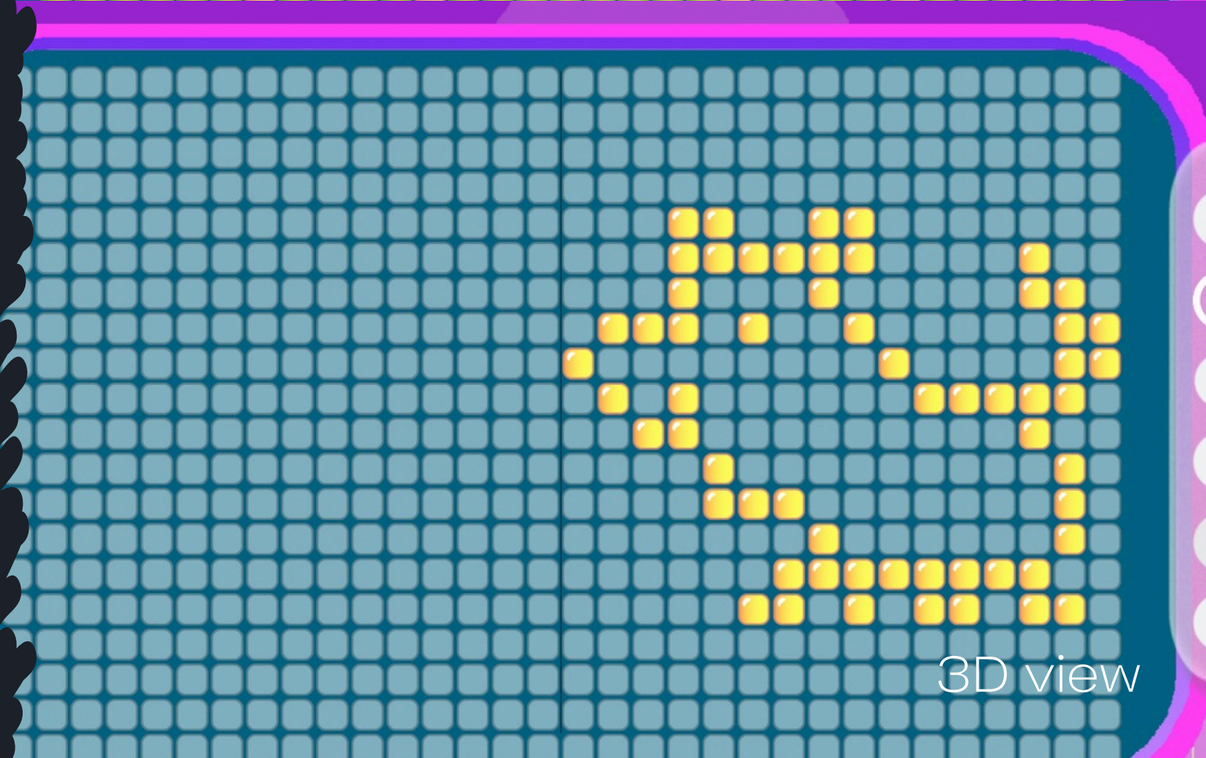
The activity ends successfully when the pattern is reproduced correctly, i.e. all the relevant boxes will be lit green and no red boxes will be marked.

How does this relate to programming?

As in the case of color coding, the participant is dealing with the encoding and decoding of the image. This time, however, it is based on a mirror image along a straight line. The code you might use to accomplish this task, for example, is based on checking vertically and horizontally which boxes to fill in.

Activity designed to work with pens.





Planet in Education

Core Curriculum for Kindergarten

Knowla

Kindergarten tasks

15. Supporting children's independent exploration of the world, selection of content adequate to the child's developmental level, his perceptive abilities, imagination and reasoning, with respect for individual needs and interests.
15. Systematic support for the development of the child's learning mechanisms, leading to their achievement of a level enabling them to start learning at school.

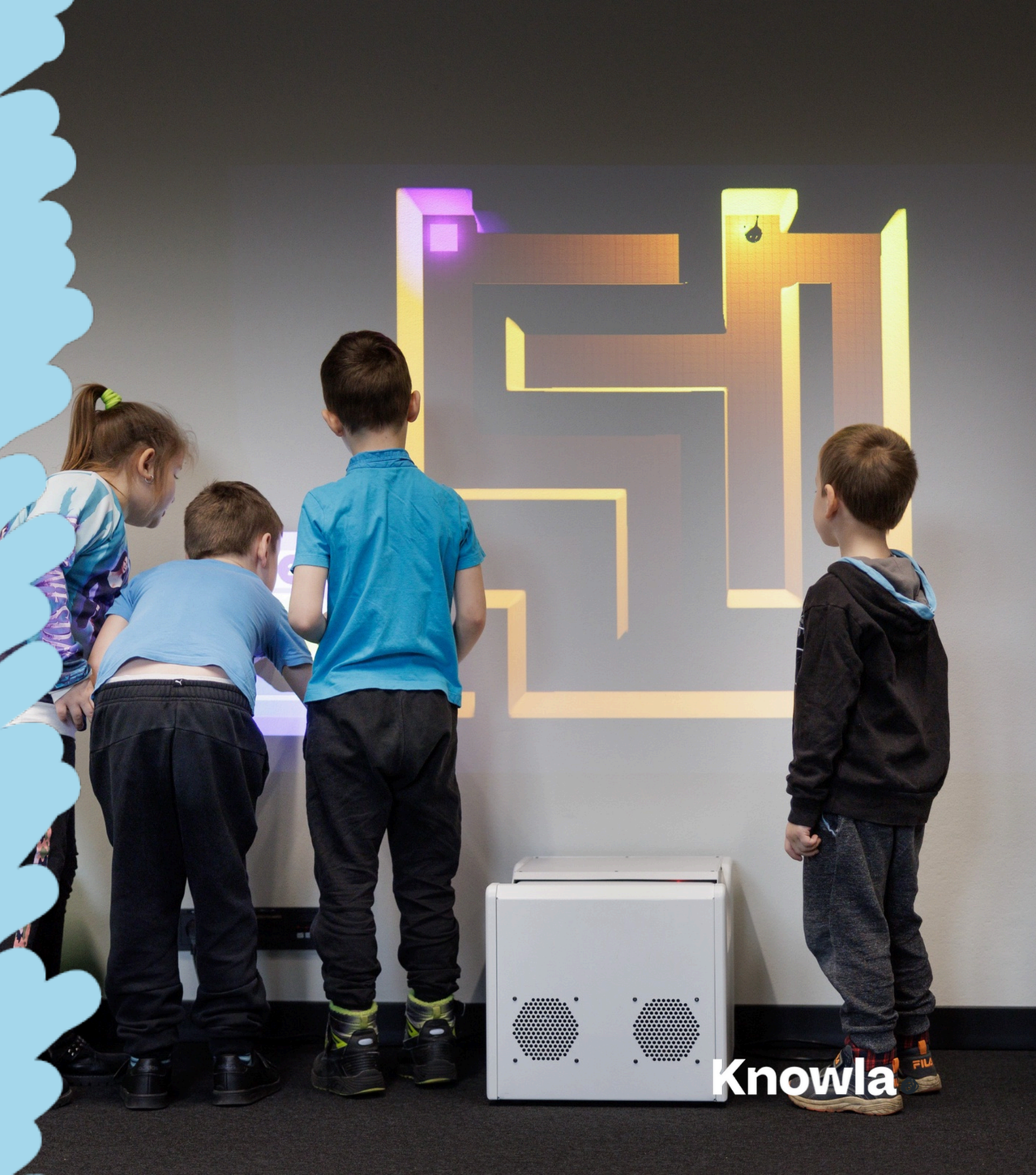
Achievements of the child at the end of pre-school education

IV. 9, 12, 14, 19. Cognitive area of child development. A child prepared to start learning at school: reads pictures, extracts and names their elements, names symbols and signs in the environment, explains their meaning; classifies objects according to: size, shape, color, purpose, arranges objects into groups, rows, rhythms, recreates objects and creates their own, giving them meaning, distinguishes basic geometric figures (circle, square, triangle, rectangle); determines directions and determines the position of objects in relation to oneself as well as in relation to other objects, distinguishes between left and right sides; undertakes independent cognitive activity, e.g. watching books, developing space with own construction ideas, using modern technology, etc.;

Knowla.

Terms and method of implementation

12. Toys are also an element of space and teaching aids used in motivating children to take independent action, discovering phenomena and ongoing processes, consolidating the acquired knowledge and skills, inspiring to conduct their own experiments. It is essential that every child has the opportunity to use them without unreasonable time limits.
13. Elements of the space in the kindergarten are properly equipped places for resting children (deck chair, mattress, mat, pillow), as well as elements of equipment suitable for children with special educational needs.



Core Curriculum for early school grades I-III

The tasks of the school in the field of early childhood education include:

1. supporting the child's multidirectional activity by organizing educational situations that enable experimentation and acquisition of experience as well as polysensory cognition, stimulating its development in all areas: physical, emotional, social and cognitive;
2. ensuring the proper organization of play, learning and rest for the continuity of adaptation processes
for all children, including those who develop in a discordant, slower or accelerated manner;
3. a-b. supporting: the child's activity, shaping the ability to use the developing mental cognitive processes necessary to create their own patterns of play, learning and rest, supporting the development of the child's learning mechanisms, leading to the achievement of independent learning competence;
4. selection (development) of a curriculum based on content adequate to the level of children's development, their perceptual abilities, imagination and reasoning, and taking into account the needs and capabilities of students who develop in a non-harmonious, slower or accelerated way;
6. ensuring access to valuable sources of information and modern technologies in the context of student development;
7. a-b. organization of classes: adapted to the intellectual needs and development expectations of children, causing curiosity, amazement and joy of discovering knowledge, understanding emotions, feelings of one's own and other people, conducive to maintaining mental, physical and social health (broadly understood health education), enabling the acquisition of experience through play , performing scientific experiments, exploring, conducting research, solving problems to the extent adequate to the development possibilities and needs at a given stage, and
taking into account the individual capabilities of each child,

Knowla

Learning objectives - general requirements

IV. 1, 5, 6, 8. In the field of cognitive development, the student achieves: the need and ability to think independently, reflectively, logically, critically and creatively; the ability to understand basic mathematical concepts and operations, using them independently in various life situations, initial math with a description of these activities: words, images, symbols; the ability to ask questions, see problems, collect information needed to solve them, plan
and organization of activities, as well as problem solving; the ability to observe facts, natural and social phenomena
and economic, conducting experiments and experiments, as well as the ability to formulate conclusions and observations;

Learning objectives - specific requirements

VII. 1. 1-3. IT education. Achievements in understanding, analyzing and solving problems. Pupil: arranges
in a logical order: pictures, texts, commands (instructions) consisting of e.g. for daily activities; creates a command or sequence of commands for a specific plan of action leading to the achievement of a goal; solves tasks, riddles and puzzles leading to the discovery of algorithms.

VII. 2. 1-2. IT education. Achievements in computer programming and troubleshooting
and other digital devices. The student: programs visually: simple situations or stories according to his own ideas and ideas developed together with other students, single commands, as well as their sequences controlling an object on a computer screen or other digital device; creates simple drawings, text documents, combining text with graphics, e.g. invitations, diplomas, leaflets, announcements; enlarges, reduces, copies, pastes and removes graphic and text elements - while improving the skills of writing, reading, counting and presenting their ideas;
VII. 4. 1-2. IT education. Achievements in the development of social competences. Learner: works with students, exchanges ideas and experiences with them using technology; uses the possibilities of technology to communicate in the learning process.

Knowla.

The planet in educational practice

Knowla

Programming makes races

Knowl's Activity: Any level of activity - Planet Pi

At the very beginning, students must familiarize themselves with the operation of the application, its purpose and possible actions and mechanisms. It is best to let them play with it for a while, so that they can learn by experience or by observing the actions of their colleagues. It is worth observing at what level they cope with the examples (there are many examples of different difficulty levels in the application). The screen can be divided into two parts, so two people can practice different examples at once.

Races can be run in different ways:

Tournament - children take part in the tournament on their own. Create a tournament table by drawing the first rival pairs. As part of the tournament, you can check who can correctly solve a given example faster. You can increase the difficulty of the examples with each step. Who will reach the final?

Team Racing - Just divide the class into two teams and arrange them in two rows on two sides of the screen. Students take turns solving one example at a time until they get to the last one. Whichever team comes first wins. You can level up later.

Teamwork - Divide the group into teams and restart the team race, but in this case teammates can work together to find a solution. In this case, smaller groups of 3-5 people will be better.

The pattern runs along the route

Knowl's Activity: Coding Patterns - Planet Pi

The task of the students is to give the next steps that will allow someone else to reproduce a given pattern symmetrically. This can be done verbally, verbally or in signs.
The game can be played in several ways.

The activity board is displayed. The task of the students is to independently or in designated groups prepare the instructions necessary to reproduce the pattern. They can write them down in words, using other signs (e.g. arrows) or prepare verbally for the task. After you are done with the preparations, choose the person who says your sequence of actions and check it for correctness. At the end, there may be a discussion as to whether there were any other options for action.
As an exercise, cardboard or another thin but hard wall that covers the entire height of the board and is high enough that you cannot peek at it will be useful. The display of the board should be done on the floor. Choose one of the boards with symmetry along the OY axis (right-to-left or left-to-right projection) and divide the students into two or more teams. We set the cardboard along the axis. Cardboard can make part of the board obscured by shadow, but with the right balance, this will not be a big problem. We set up two teams on opposite sides. The goal of the first team is to communicate what pattern the second team on the other side should follow. After the discussion is over, we evaluate the results.

The pattern runs along the route

Knowl's Activity: Coding Patterns - Planet Pi

3. Divide students into teams. In the first phase, only one of the teams has a preview of the device. You can invite the team to the room in turn, hide the image from the rest of the team, or keep them busy with another task. The team's task is to write down the clues about the pattern. They can be verbal, graphic, using arrows or in any other way. When a team is done, change the board and ask the next team to do the same, and so on until all teams have completed the task. When everyone is done, collect the clue cards and randomly give the clues to each team. The boards are displayed in random order and the team that received the instructions to complete it presents a solution in accordance with the instructions. You can also include boards that neither team had for the feint. Then you can develop the activity on an ongoing basis.

IMPORTANT! In any of the variants, you should rely mainly on the clues received from the person/team, and not on what the participants saw themselves on the opposite side or on a flashing image. If the directions given tell the team to tick the wrong box, check it and then work together to figure out what went wrong.

Mathematics runs and decodes

Knowl's Activity: Number Encoding - Planet Pi

You must enable the application on any board. The task of the students is to invent and write down such a mathematical operation, the result of which will be the number they color/decode. It can be any field with any number. You can use
from any activity and any complexity. Ideally, the actions should not be repeated, or at least not in a fairly close order from each other. Once you have entered and saved a valid action, you can uncheck the box.

The activity can also be carried out in the form of a team task, then the team that will have the most correct and different actions saved after coloring all the fields wins.

Knowla.

It's smart to play.

For more inspiring content, please visit www.knowla.eu

Knowla