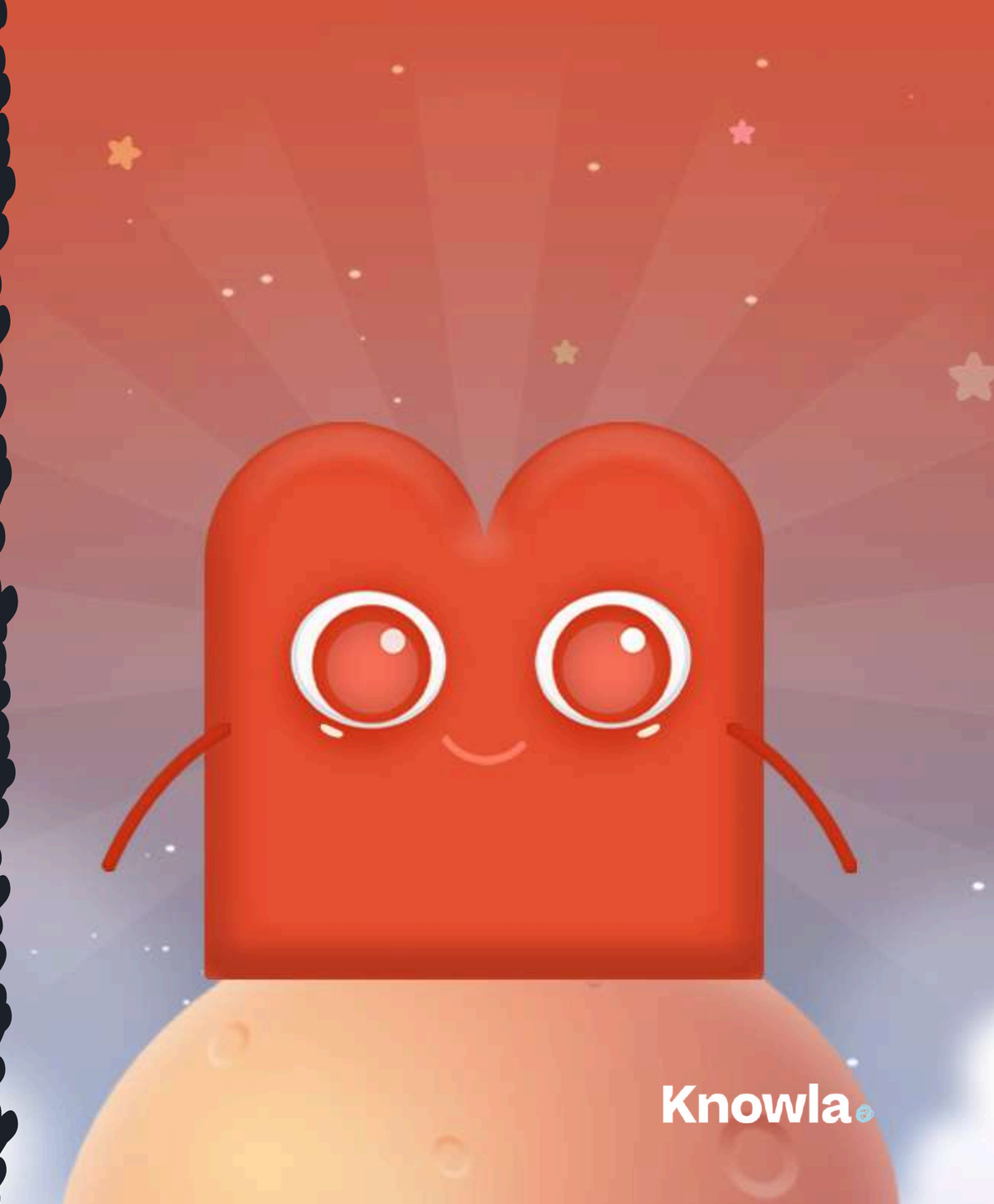
Planet Sigma

For Sigma, math matters.



The Planet Sigma contains 667 interactive activities to develop mathematical skills.
The division into different levels of difficulty allows the use of activities during classes with both preschool and school-age children. Exercises include operations on natural numbers (addition, subtraction, multiplication, division), integers and fractions (decimal and ordinary), geometric figures, units of time, length, weight and capacity.
The tasks included in the package develop children's ability to perform calculations and apply them in practical situations in life. They teach how to read, interpret and process data presented in various forms, as well as to notice regularities, similarities and analogies. They improve the skills of logical thinking and problem solving (computational thinking, cause and effect thinking).

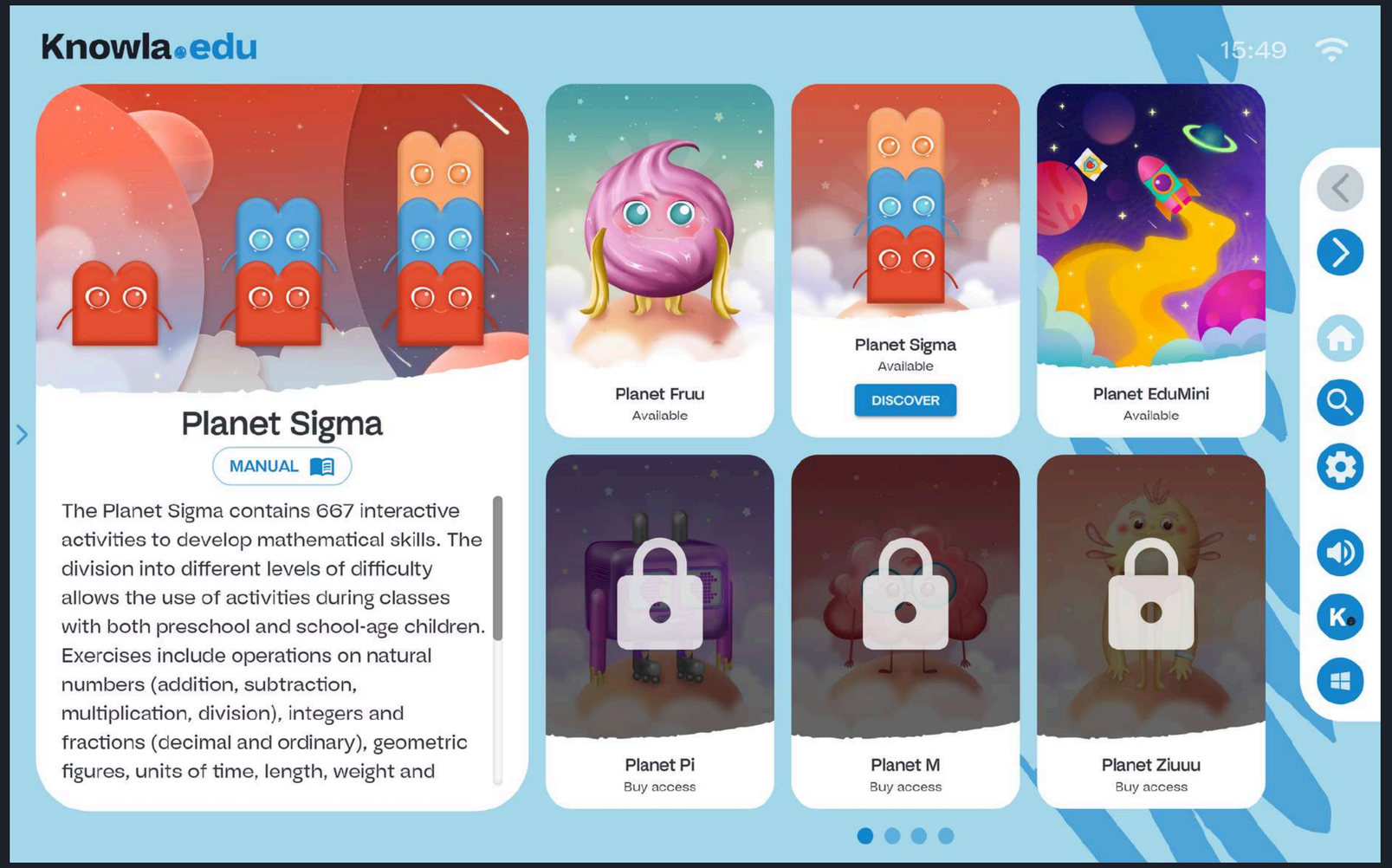
Knowla's apps are dedicated to children from the age of 3.

Planet Sigma apps include difficulty levels:

- level 1: 5 - 7 years,
- level 2: 8 - 9 years,
- level 3: 10+ years

The age of use of the application is only suggested. Each activity and its level should be selected according to the student's skills and their special educational needs (both those leveling the level and developing talents).

Planet Sigma in the Educational Universe



Knowla.

System buttons and menu view

Knowla

Main menu - Knowla Box/Knowla Wall

return to all planets view

previous planets/apps/activities

more planets/apps/activities

move to the application search engine

go to settings: language selection, license key 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

Main menu - Knowla Web

previous planets/apps/activities

more planets/apps/activities

return to all planets view

full screen mode/exit full screen mode

go to settings: language selection, license key activation

log in/register to Knowla Web

Menu icons in activities - legenda

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

reload activity; any changes made will be lost

sound on/off

exit to activity selection list,
any changes will be lost

previous board

next board

reset timer

accessibility panel (including colour adjustment)

interactive activity guide

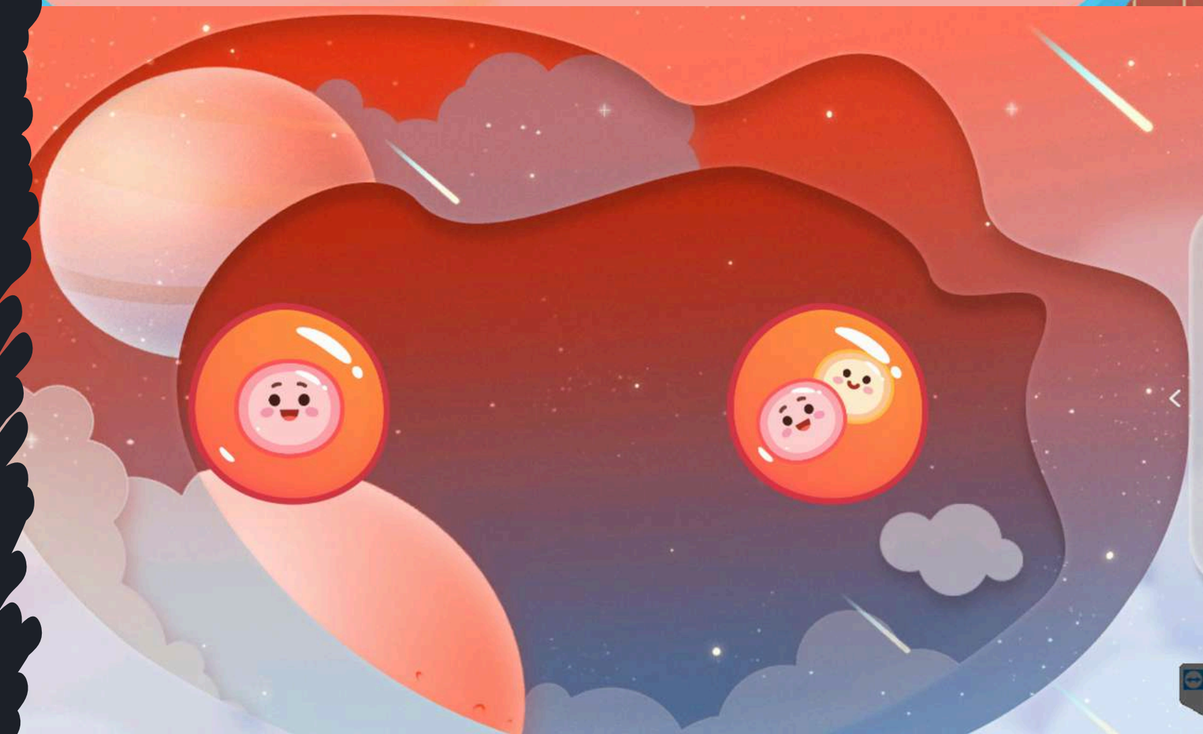
Successful activity

Activity for one or two players

For activities in two-person mode on Knowla Box/Wall, a board appears where pens are assigned. Within an activity, an Epson interactive pen with a blue and orange tip can be assigned at the same time. Activities for two people will also be available to play on Knowla Web devices. Please note the parameters of your device and its capabilities, including the ability to use two touch sources or pens at once.

A timer and the number of examples correctly completed are available separately and independently on each page where students can compete against each other. A double performed activity does not double count in the scoring. At the end of the time, a green smiley face appears on the side of the person with the highest number of correctly solved activities. In the event of a tie, it will appear on both sides. Participants can choose at the beginning which example they will perform independently of each other.

Buttons will appear in the side panels, some of which will only be valid on that side e.g. next board, refresh. Some of them will only be valid when pressed on both sides: reset clock, exit activity, turn off/on sound.



Activity list with quantity or time

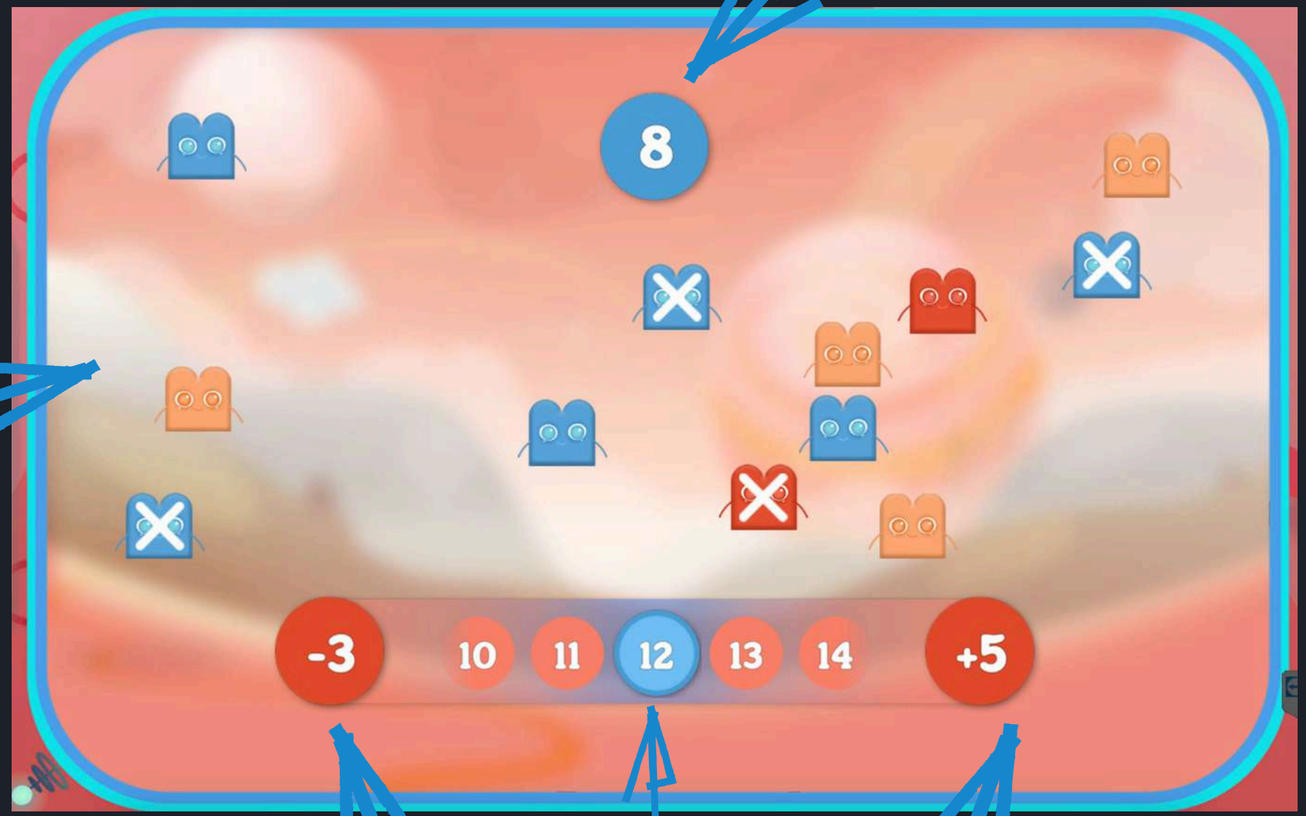
The Planet Sigma includes 16 apps with 667 activities:

1. Count on the scale - 3 levels, 60 activities
2. Sequence of rhythm - 4 levels, 80 activities
3. Math sudoku - 3 levels, 90 activities
4. What time is it? - 1 activity
5. Set the clock -1 activity
6. Count the figures - 3 levels, 90 activities
7. Missing Piece 2D - 20 activities
8. Missing Piece 3D - 2 levels, 40 activities
9. Counting the set - 4 levels, 4 activities
10. Math scenarios - 2 activities
11. Logical weighing - 3 levels, 90 activities
12. How much does it weigh? - 3 levels, 90 activities
13. Weigh the equations - 3 levels, 60 activities
14. Compare the sets - 3 levels, 36 activities
15. Checkers - 1 activity
16. Multiplication - 12 activities
17. Reverse multiplication - 12 activities

Knowla

Count on the scale

Legend:



purpose

space elements

current number

scale actions, e.g. -1, +2

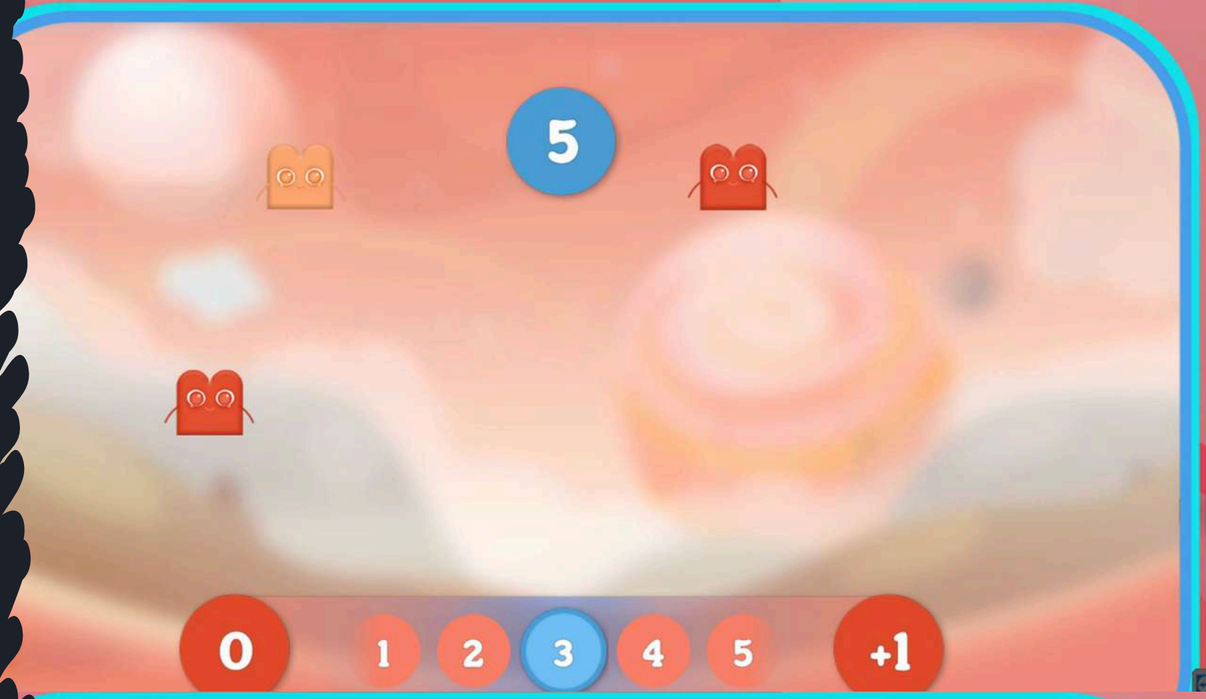
Count on the scale

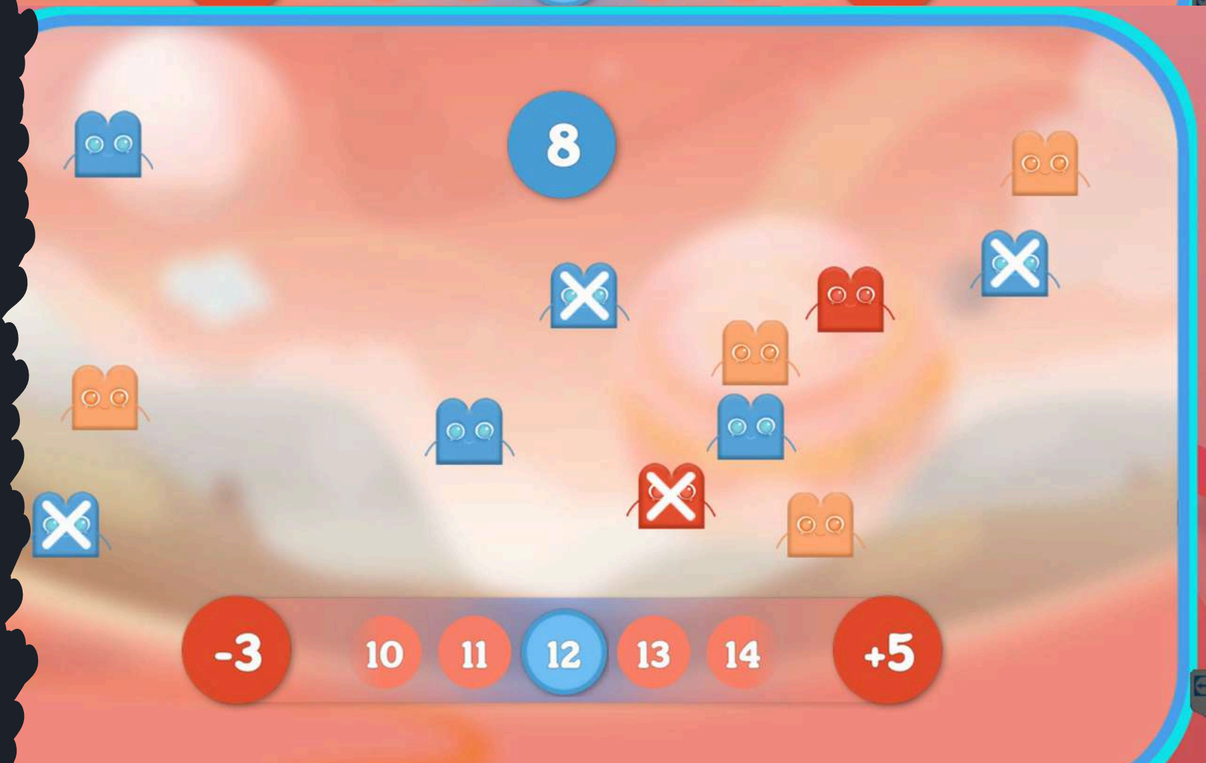
The participant's task is to reach the goal number written at the top of the screen using the actions written on the right and left sides of the scale (e.g. (-1) - subtract one, (+3) - add three, (0) - no change). As you perform actions, the current number on the scale and the number of items in space will change. Crossed characters appear when there are more creatures than the number of the target. The activity ends successfully when the participant reaches the goal written above.

The levels differ in the difficulty of the actions performed on the scale. In the first level, the operations are one-way only (adding elements), and in the other two, they are two-way operations (subtraction and addition).

Mathematical operations:

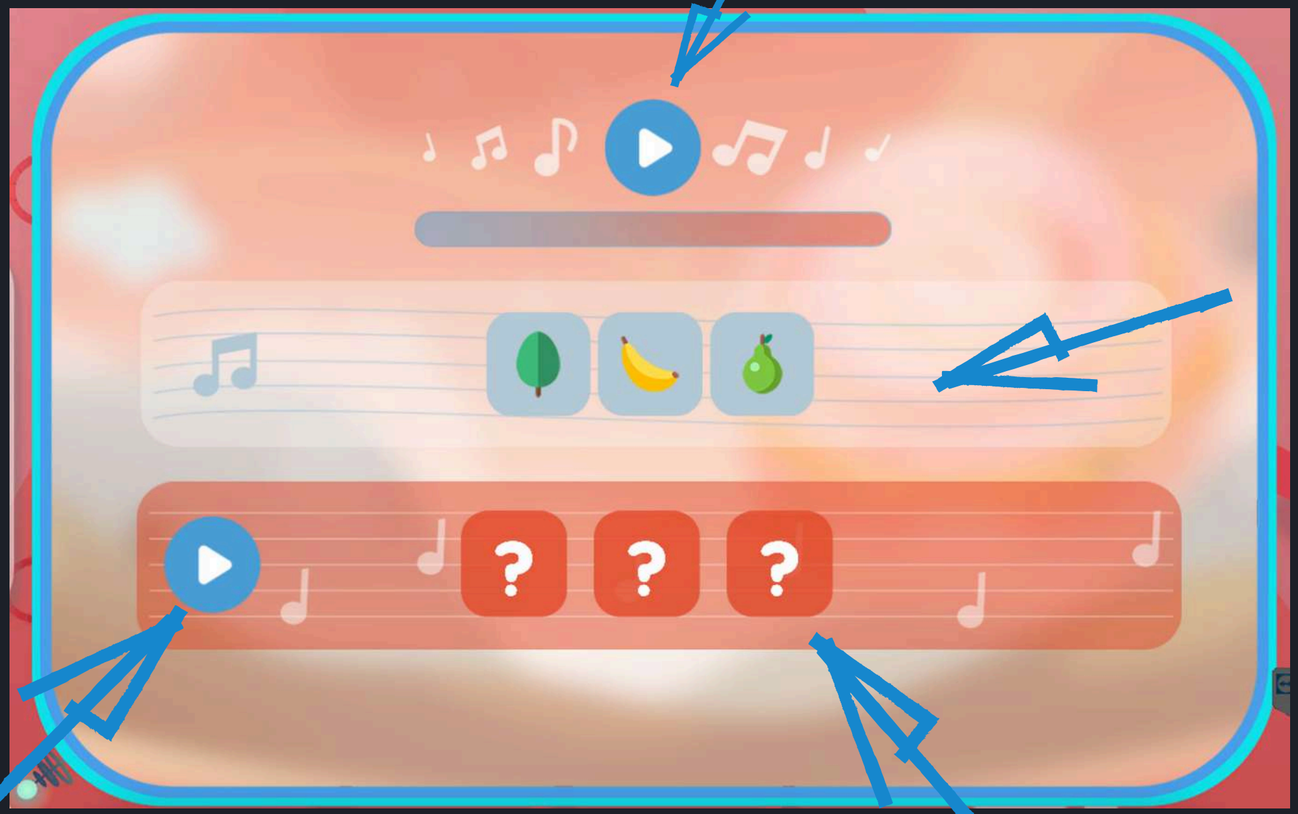
scale, addition, subtraction, sets, up to 20





Sequence of rhythm

Legend:



Sequence of rhythm

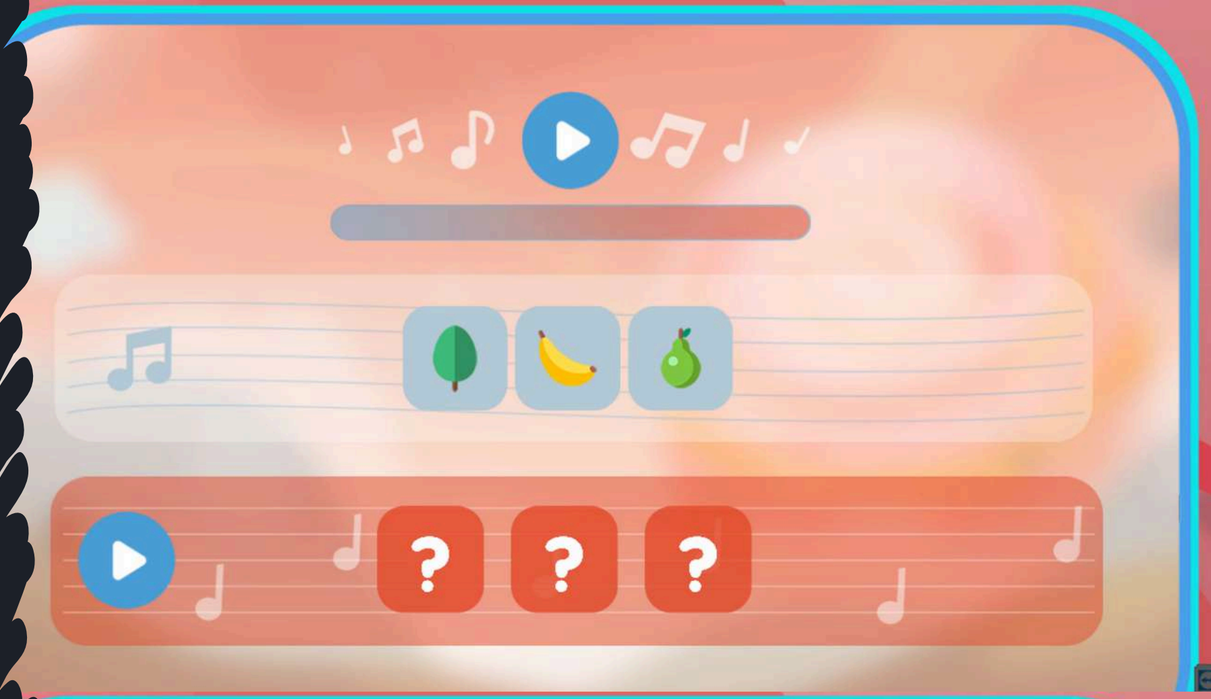
The activity sound should be turned on.

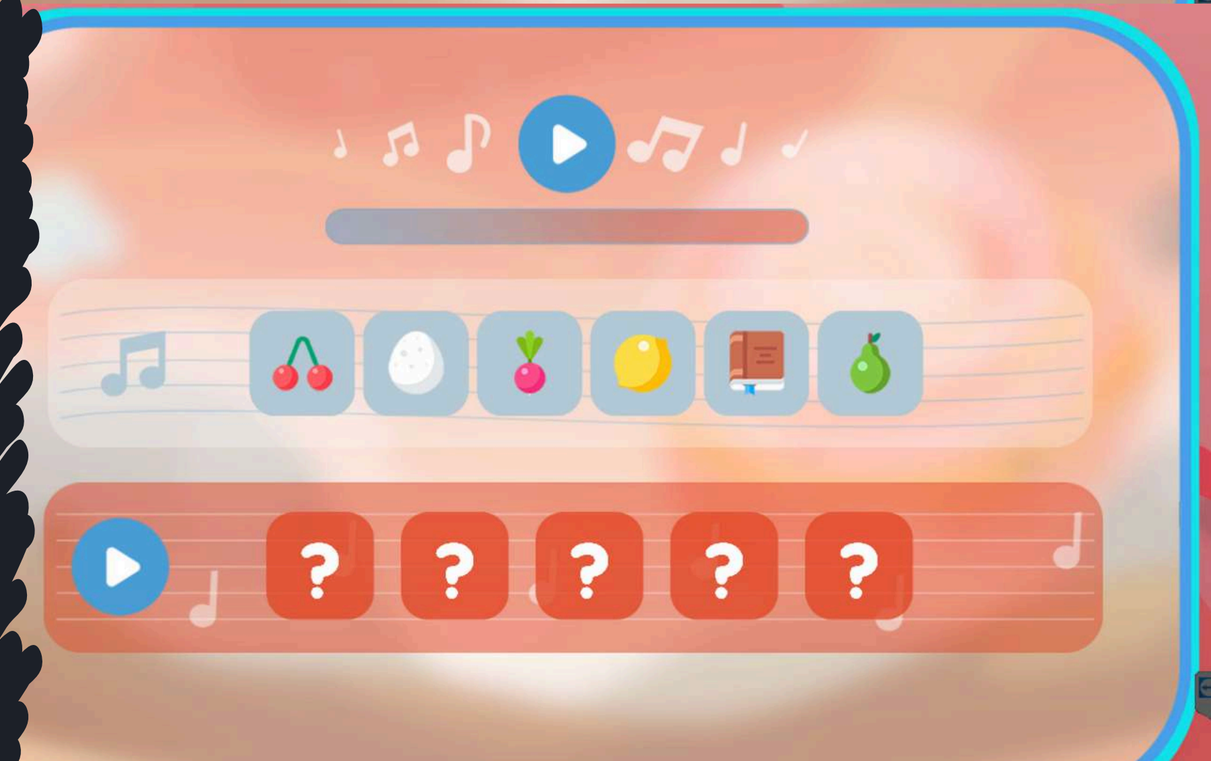
The task of the participant is to arrange the elements correctly to play the melody at the top. You can play the master tune as many times as you like and at any time during your activity by clicking the blue Play button at the top.
By clicking on each item, you can hear the sound assigned to it. To set an element in the fields for arranging a melody, click on a given element (mark it), and then on the appropriate field to be arranged. The order in which they are placed matters. Elements in the fields to be arranged can be changed to others by clicking on another element and then on a given field. It will then change the symbol in the given box.
Within one selection of elements, they can be set in several fields to be arranged. The same element may appear several times in a melody. At any time, you can listen to the currently composed melody by clicking on the blue Play button next to the places for arranging sounds.
The activity is successful when the melody is correctly arranged. If the subsequent sounds are set incorrectly, after playing the arranged melody, below will be shown with ticks and X signs, which fields are correctly or incorrectly completed.

The levels differ in the number of sounds to choose from or the number of sounds used in creating the melody.

Mathematical operations:

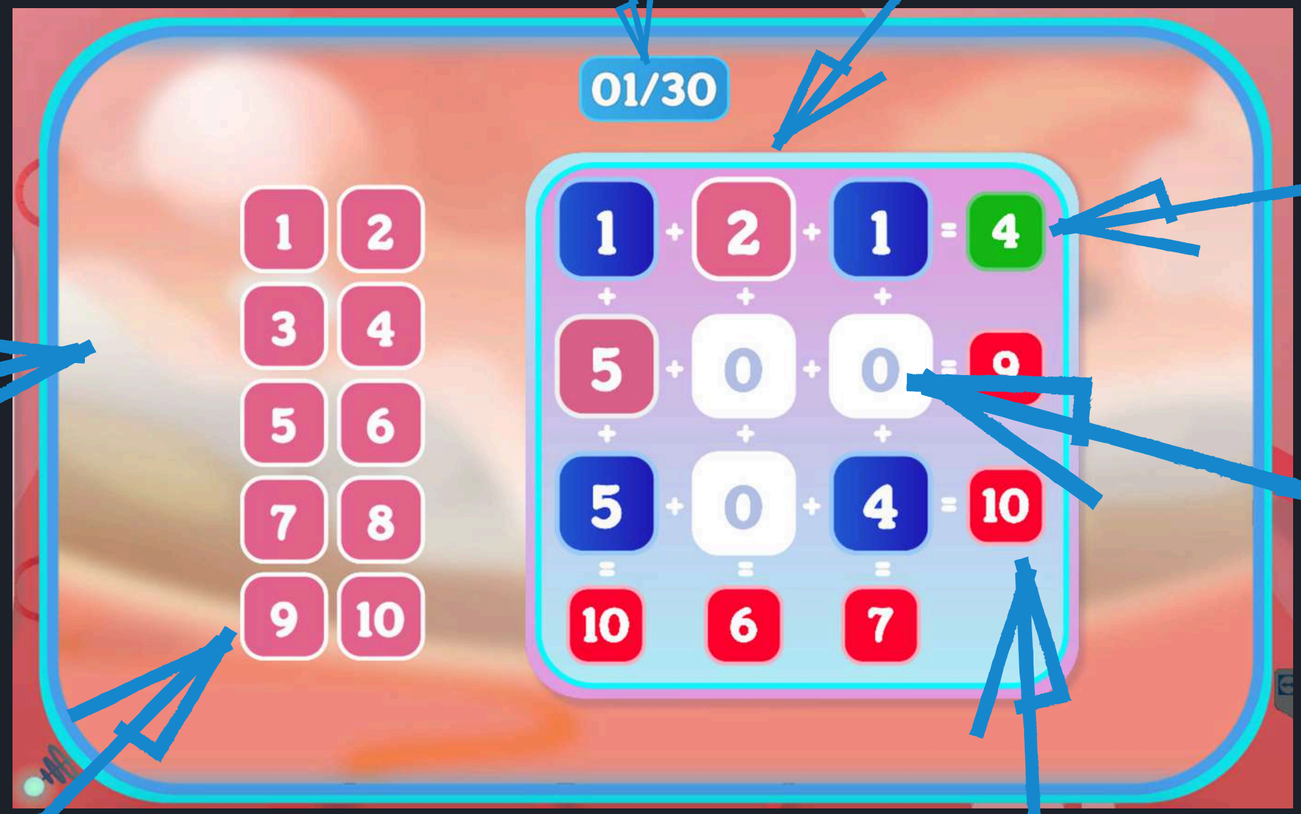
seeing patterns, strings





Math sudoku

Legend:



Math sudoku

On the board there are various numbers arranged in arithmetic operations. The task of the participant is to insert the numbers on the side of the board so that after performing the given calculations, each vertical and horizontal result is true. To do this, press the pen on the selected number from the numbers to choose from (pink), and then on the field of places to be completed (white).
After inserting the number, the box will turn pink. You can return to zero after pressing the field again (the color will remain pink, but it is not of great importance in solving the task). Clicking again will restore the previously inserted number.
The white or pink squares on the board can be changed as many times as you like. The blue, red and green squares cannot be swapped. If a row or column has a valid score, the score box will turn from red to green. The activity is successful when all result fields are green.

Pay attention to the action symbols between the numbers.

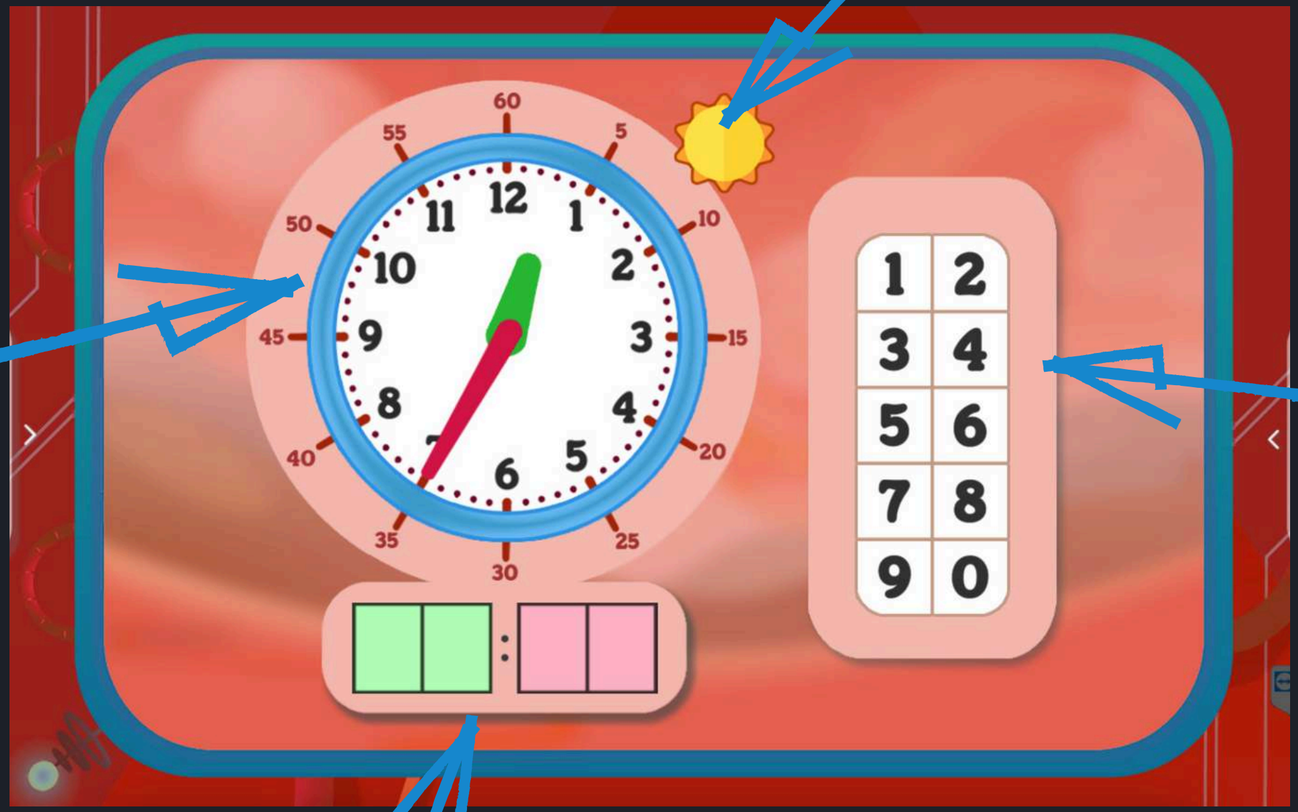
The levels differ in the difficulty of actions in Level 1 are only the action of adding and subtracting up to 10. In the others there are all actions, of which in Level 2 the actions are up to 50, and in Level 3 up to 100. They also differ in the number of fields to be completed, and therefore difficulty.

Mathematical operations:

addition, subtraction, multiplication, division, completion of operations, order of operations

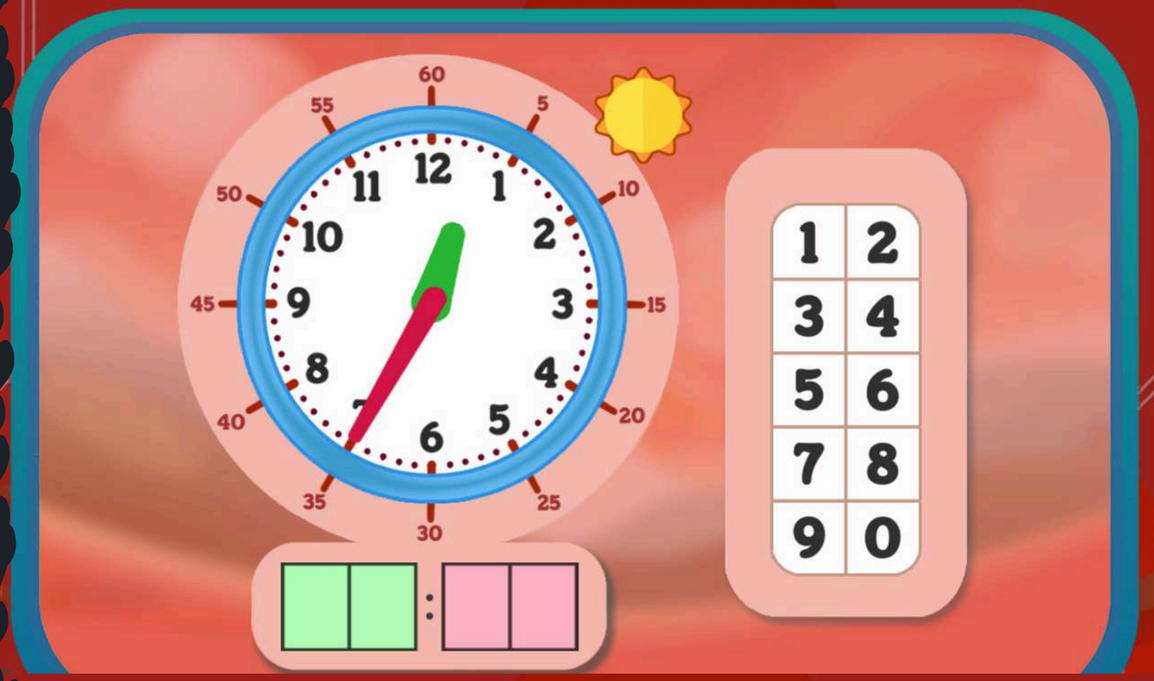
What time is it?

Legend:



What time is it?

The participant's task is to write down the time marked on the clock face with the hands on the digital clock display below.
For convenience, the time of day is marked with the sun (daytime hours from 0 to 12) or the moon (afternoon and night hours from 13 to 24). The dial shows the values for the hour and minute hands.
The colors of the tips correspond to the colors of the fields on the digital display. To save the indicated time, click on the number on the numerical keyboard, and then on the appropriate field on the display.
So sequentially until the participant has all the boxes.
The activity is successful when all fields are filled in correctly.

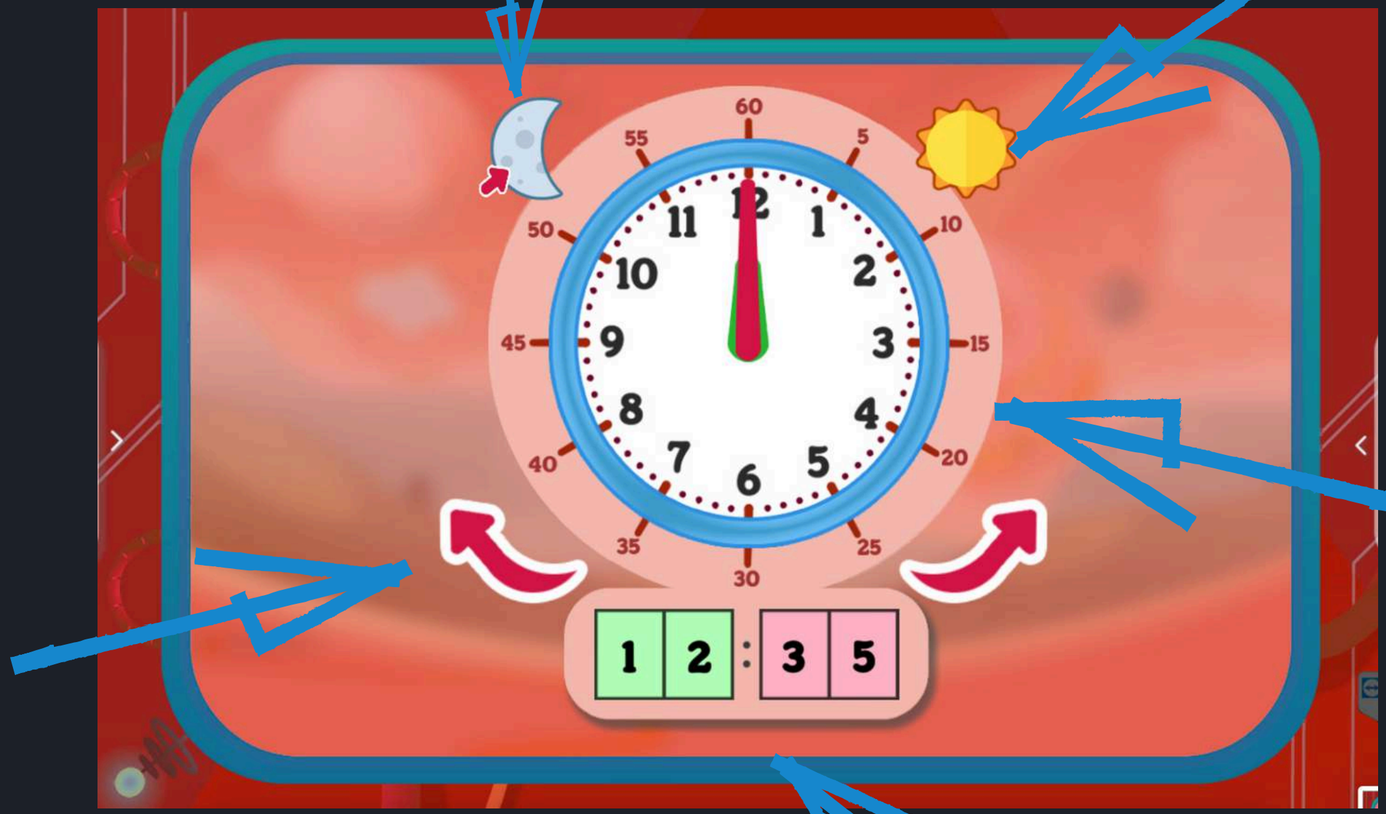


Mathematical operations:

reading the clock, time

Set the clock

Legend:

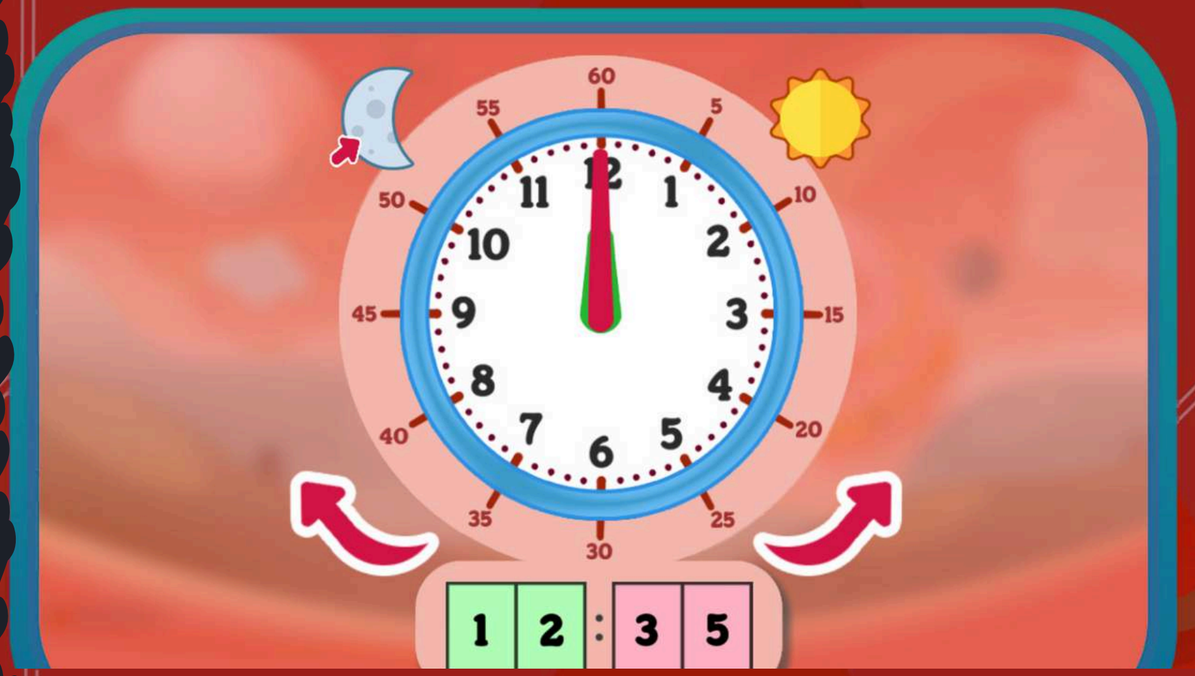


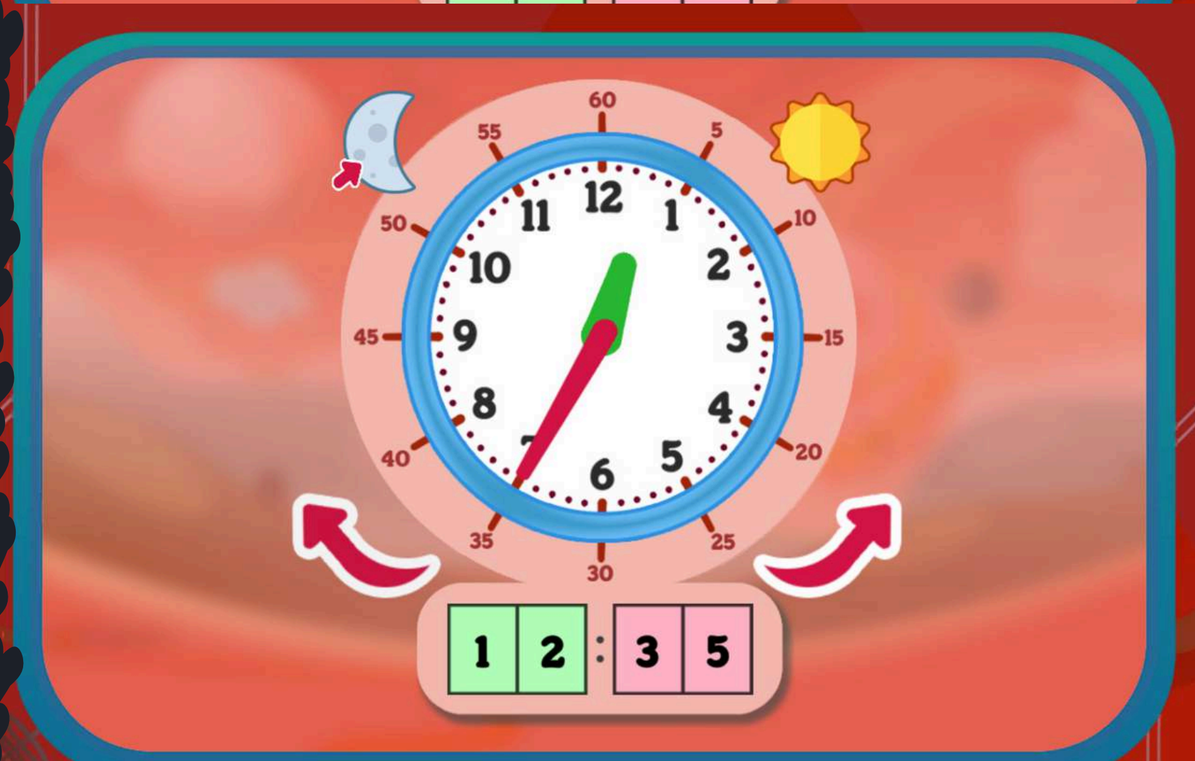
Set the clock

The task of the participant is to mark on the clock face the time given below on the digital display.
To do this, specify the time of day and mark the moon or sun accordingly. Then move the hands so that they point to the correct time.
At the beginning of the activity, the hour hand (green) moves. This can be changed by clicking on the corresponding boxes on the digital display. If you click on the red fields on the display, you can move the minute hand (red). If the participant clicks on the blue boxes on the display, the second hand (blue) will move.
Clicking on the green boxes will make it toggle the hour hand (green) again. The colors on the digital display correspond to the colors of the hands.
Note that by moving the minute or second hand, you can switch the hands with higher values at the same time according to the rules of the clock.

Mathematical operations:

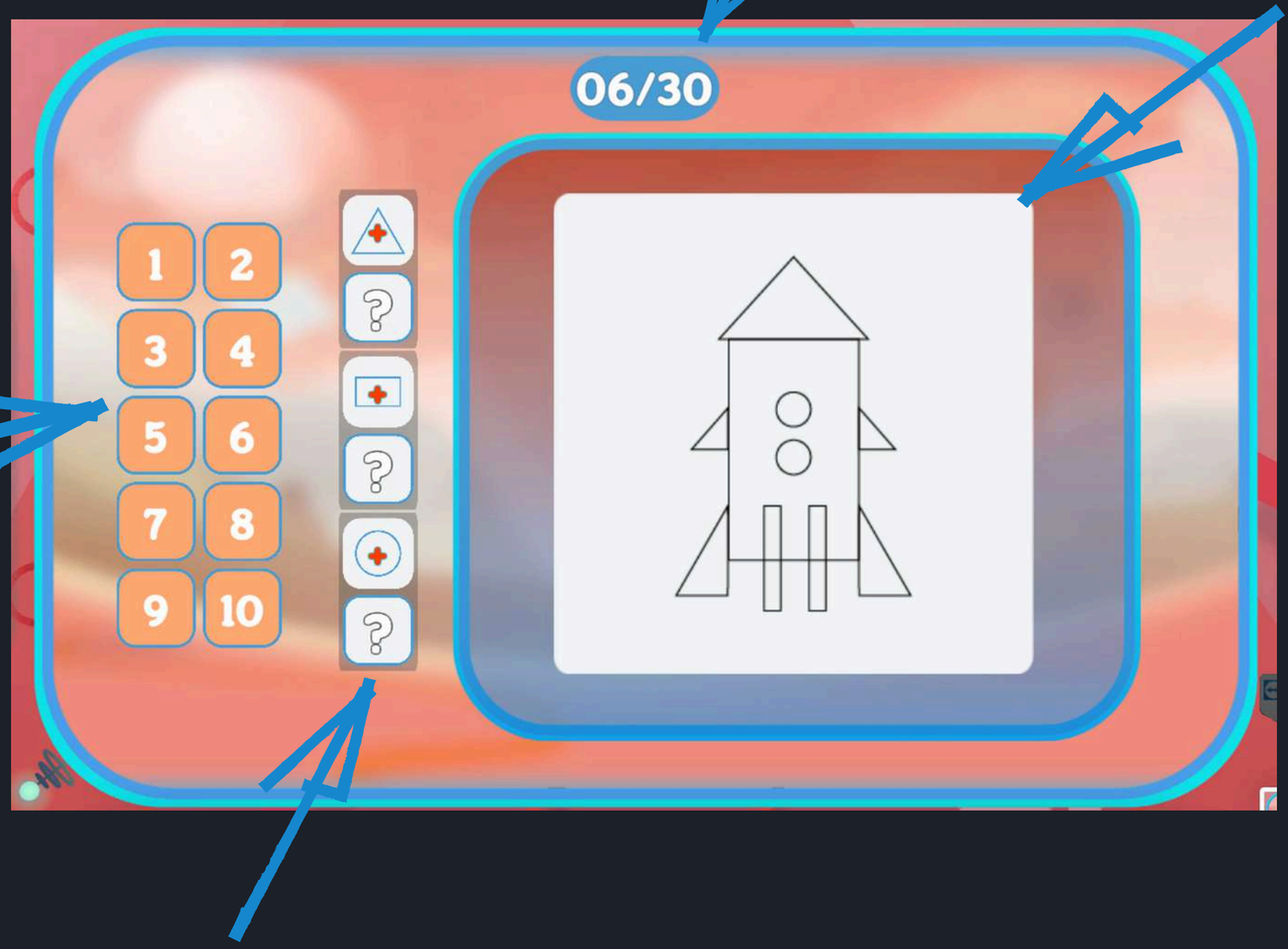
clock, time





Count the figures

Legend:



In the case of a two-player game, a timer and the number of correctly completed examples appear separately and independently on each side for students to compete against. Doubling an activity does not count twice in the score. At the end of time, a green smiley face appears on the side of the person with the most correctly solved activities. In case of a tie, it will appear on both sides. Participants can choose at the beginning which example they will do independently.

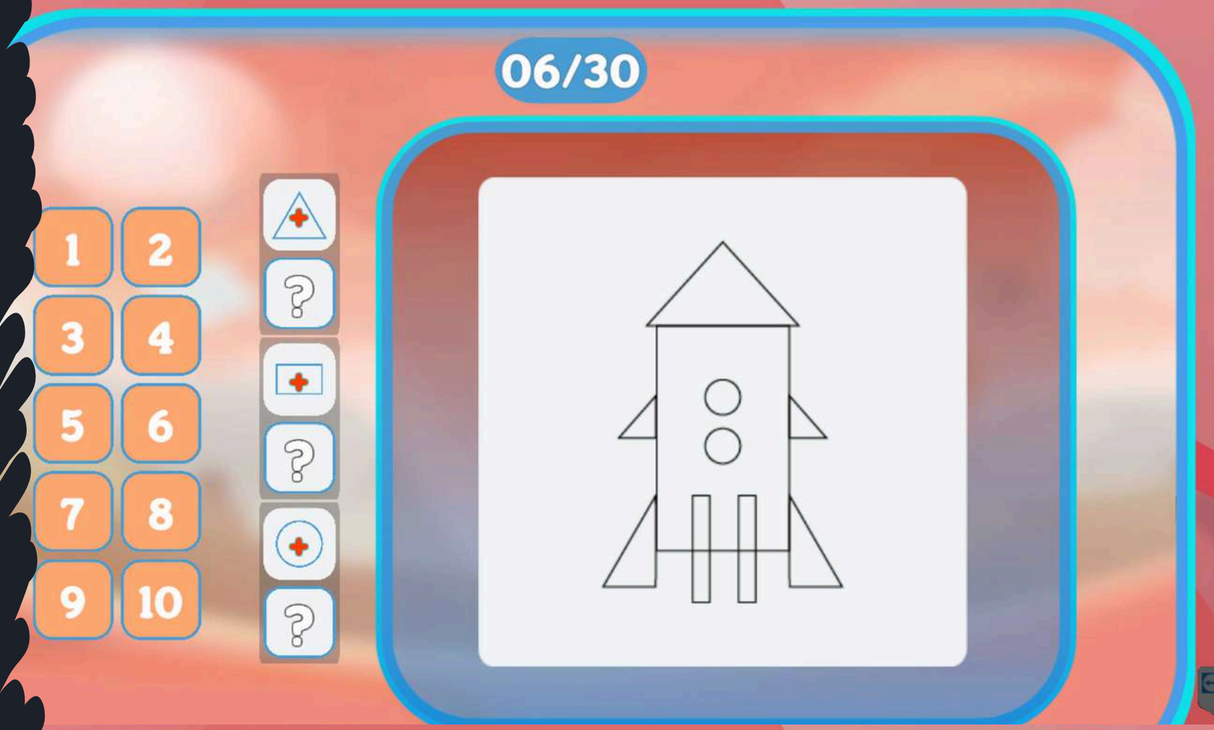
Count the figures

The task of the participant is to count all the figures in the picture, and then insert the appropriate number in the place of the question mark next to the correct figure (under the figure or on the right side of it, depending on the mode).
To do this, click the appropriate number on the keyboard (on the left or at the very bottom - brown numbers), and then on the field with a question mark after the figure being counted. The numbers can be changed any number of times.
A correctly entered number will be highlighted in green. From time to time, red plus or minus signs appear on the input panel on the figures. They indicate whether the given number is less than or greater than the correct one.
The activity is successful when all fields are filled in correctly.

Important! If rectangles and squares are counted separately, the squares do not count towards the sum of the rectangular figures.

The levels differ in the complexity of the figures, and thus also in the number of elements to be counted.

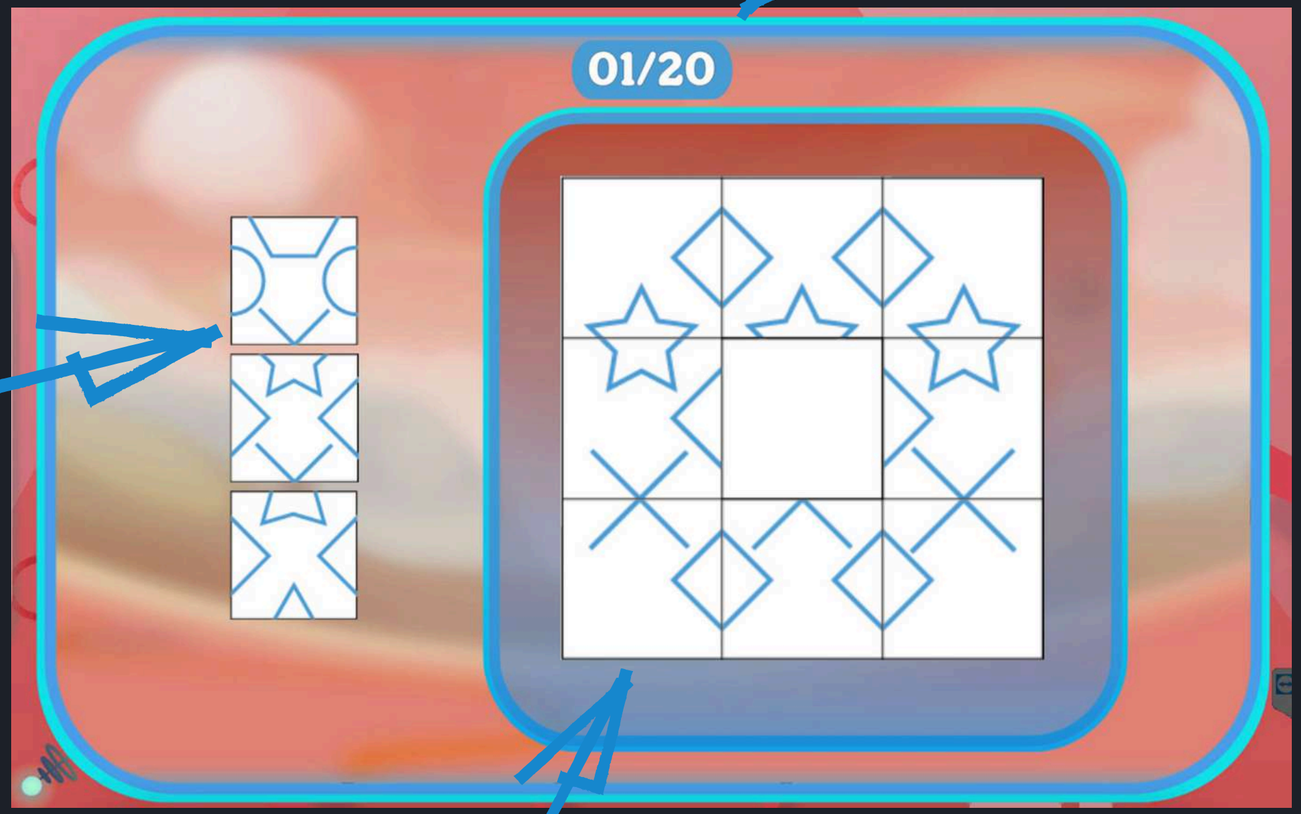
Mathematical operations:
geometry, figures, counting



Missing element 2D & 3D

activity number

Legend:



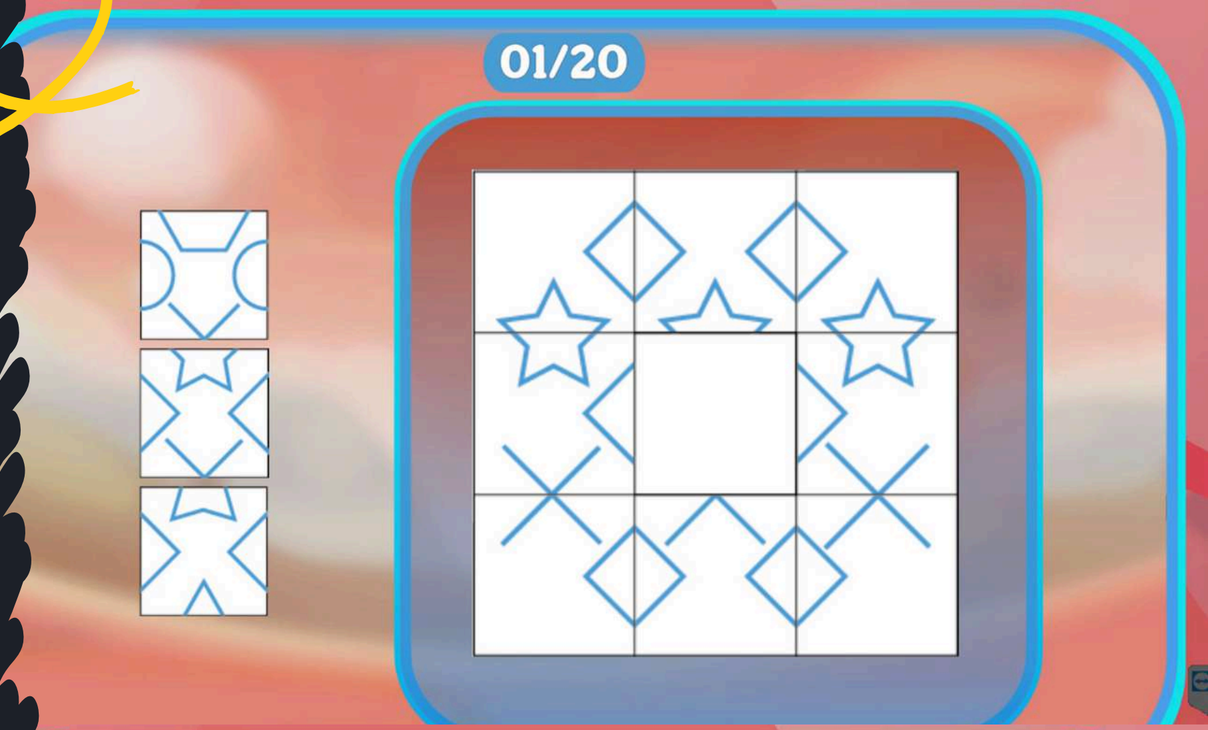
elements
for use

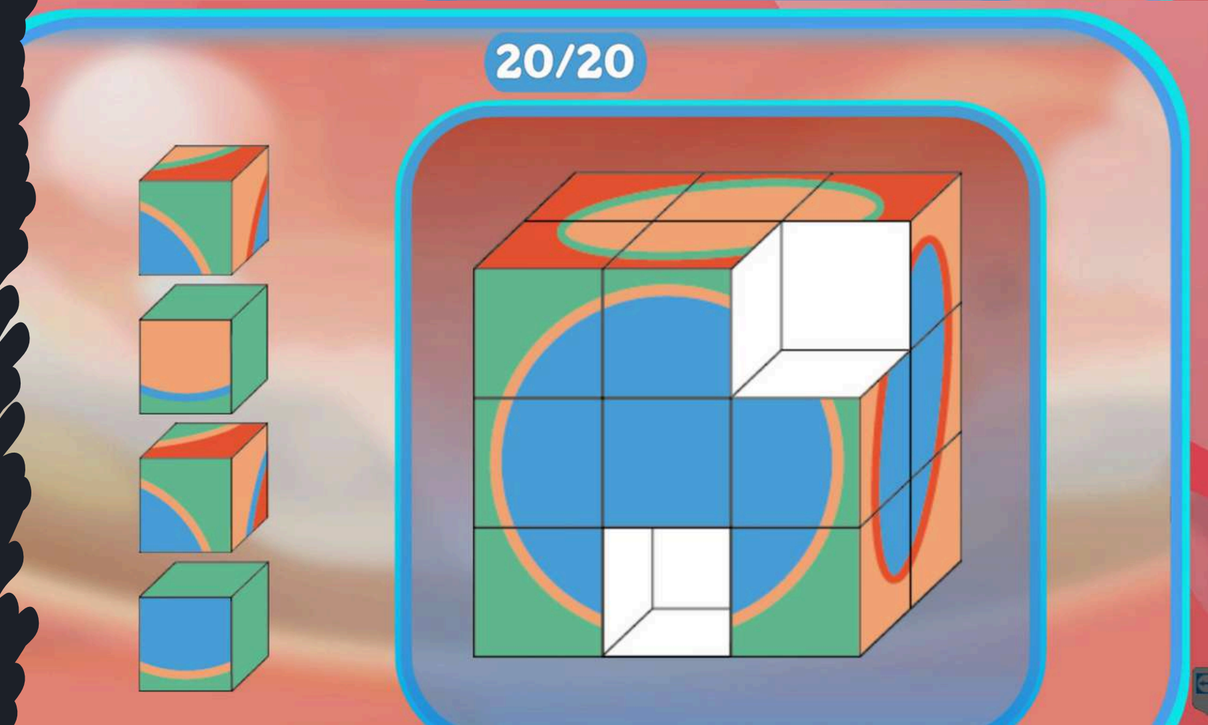
board to be completed

In the case of a two-player game, a timer and the number of correctly completed examples appear separately and independently on each side for students to compete against. Doubling an activity does not count twice in the score. At the end of time, a green smiley face appears on the side of the person with the most correctly solved activities. In case of a tie, it will appear on both sides. Participants can choose at the beginning which example they will do independently.

Missing element 2D & 3D

The task of the participant is to put the missing block in its place. It must match the pattern on the outside of the dice or complement the 3x3 board. In the case of the 3D version, the pattern or color on the inside walls of the cube does not matter.
To insert an element into its place: click on the selected element, and then press on the selected place. The activity will be successful when all items are in the right place.





Mathematical operations:
seeing patterns, strings

Counting the set

Legend:

Counting the set

The task of the participant is to translate as many elements from the set of elements (red frame) to the target set (blue frame) so that the equality at the top of the blue set is true. To do this, click on the selected element and then on the place where it should be located. When an item is in the blue box, the value of the equation on the right will also change accordingly. Elements can be freely moved between frames and inside frames as many times as you want.
The equation value will continuously update after each move. Item type doesn't matter (carrot = 1, hamburger = 1). However, attention should be paid to the occurrence of fractional values, e.g. half an orange = ½, a quarter of a cake = ¼, and collective blocks, e.g. 5 apples = 5. When the participant decides that the equality is true, he should click on the tick on the right side of the blue frame. If the task was completed correctly, the activity is successful. If the result is incorrect, icons will appear below the button to indicate whether there are currently too many or too few items in the set.

The levels differ in the number of elements to be moved. In levels 2 and 3, fractions or collective blocks appear. In addition, in Levels 1, 2, 3 there are more and more complex values or actions that must be performed to complete the task.

Mathematical operations:

sets, addition, subtraction, multiplication, division, fractions, order of operations, equality

Math scenarios

A cooperative puzzle game.
At the very beginning, the pens must be assigned, but the task can also be done with one pen if both pens in the window are selected with the same pen (this is only possible in this application). However, for the pens to work independently, it should be noted that each of them has a different tip.
The pen assigned on the right is pink in the app, while the one on the left is blue. There are two independent stories to choose from. In each of them there are elements to click and mathematical puzzles to solve that will allow us to move on. In moments of rest, balloons will appear that inform you what the creatures need.
Some items can only be activated by one of the pens. By pressing on an element, a pen icon will appear with the color of the one that can be used, for example, to move an element or solve a given puzzle. Some elements can be made with both pens.

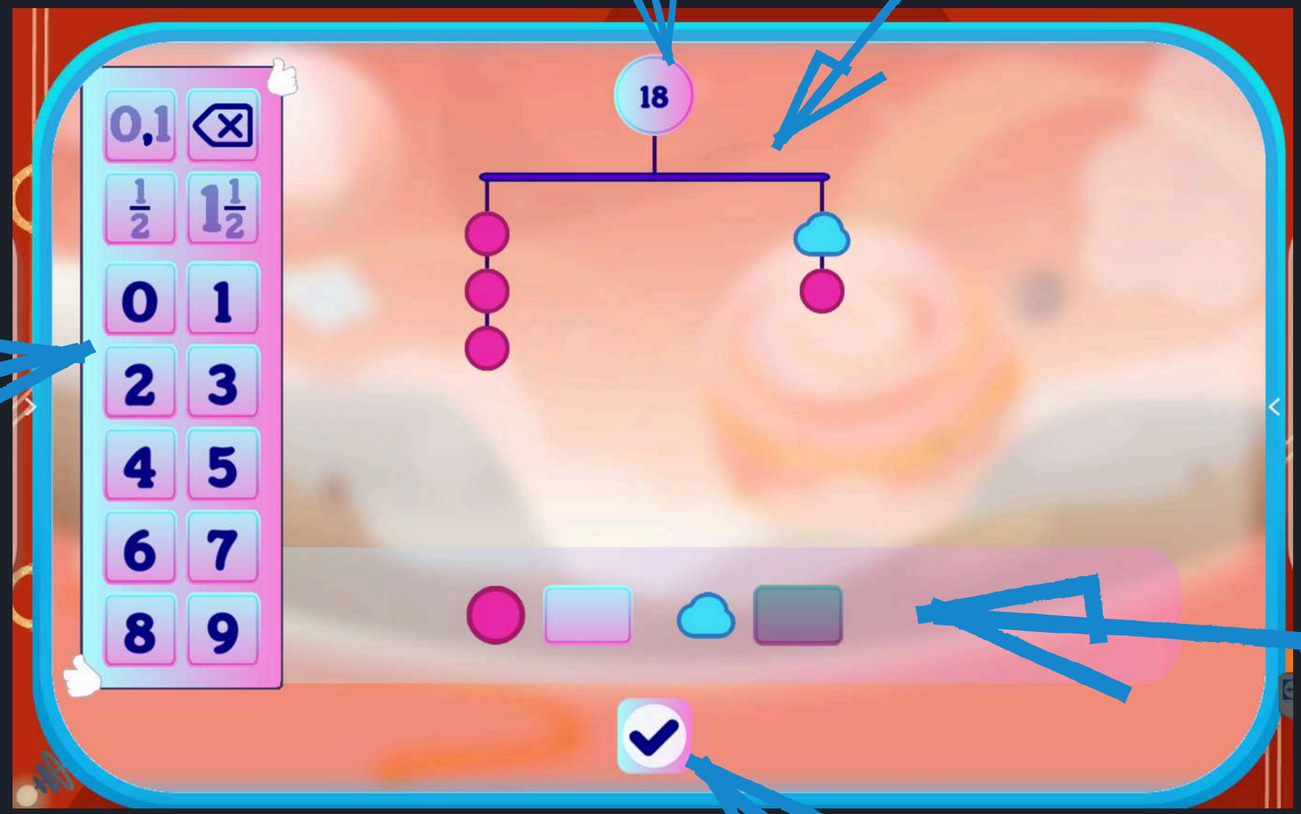
Both scenarios have several scenes and their own story to tell.

Mathematical operations:

addition, subtraction, multiplication, division, order of operations, fractions, negative numbers, right triangle, exponents, puzzles

Logical weighing

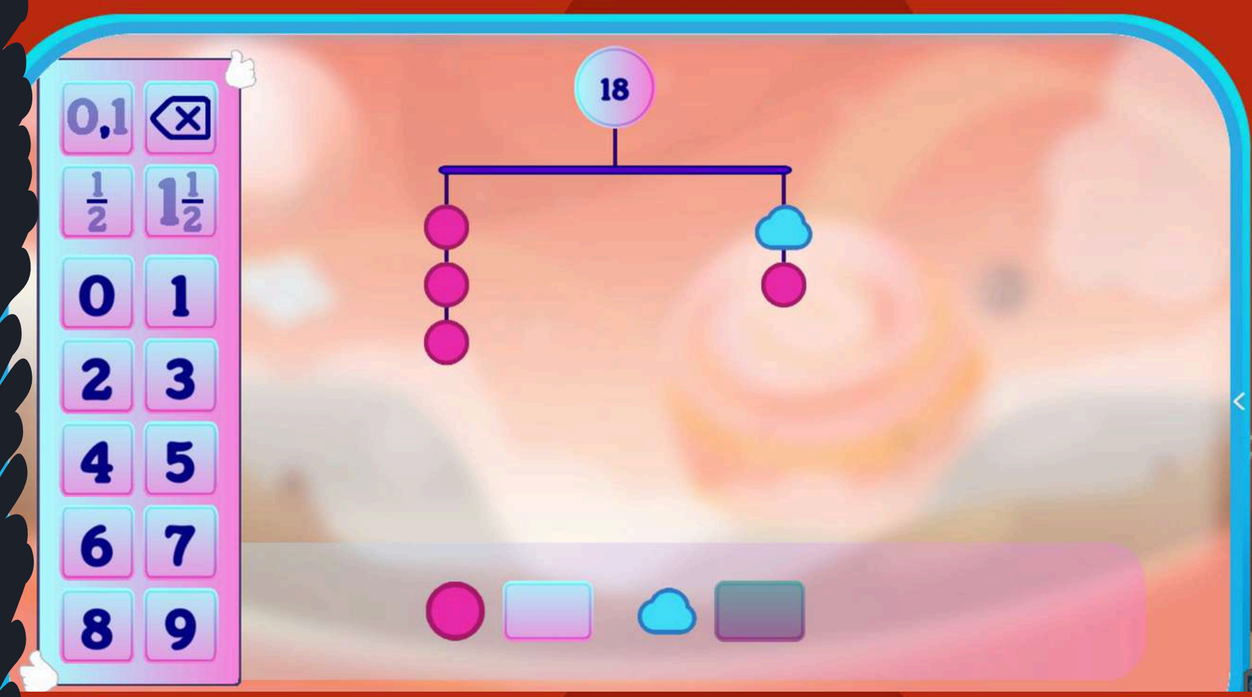
Legend:

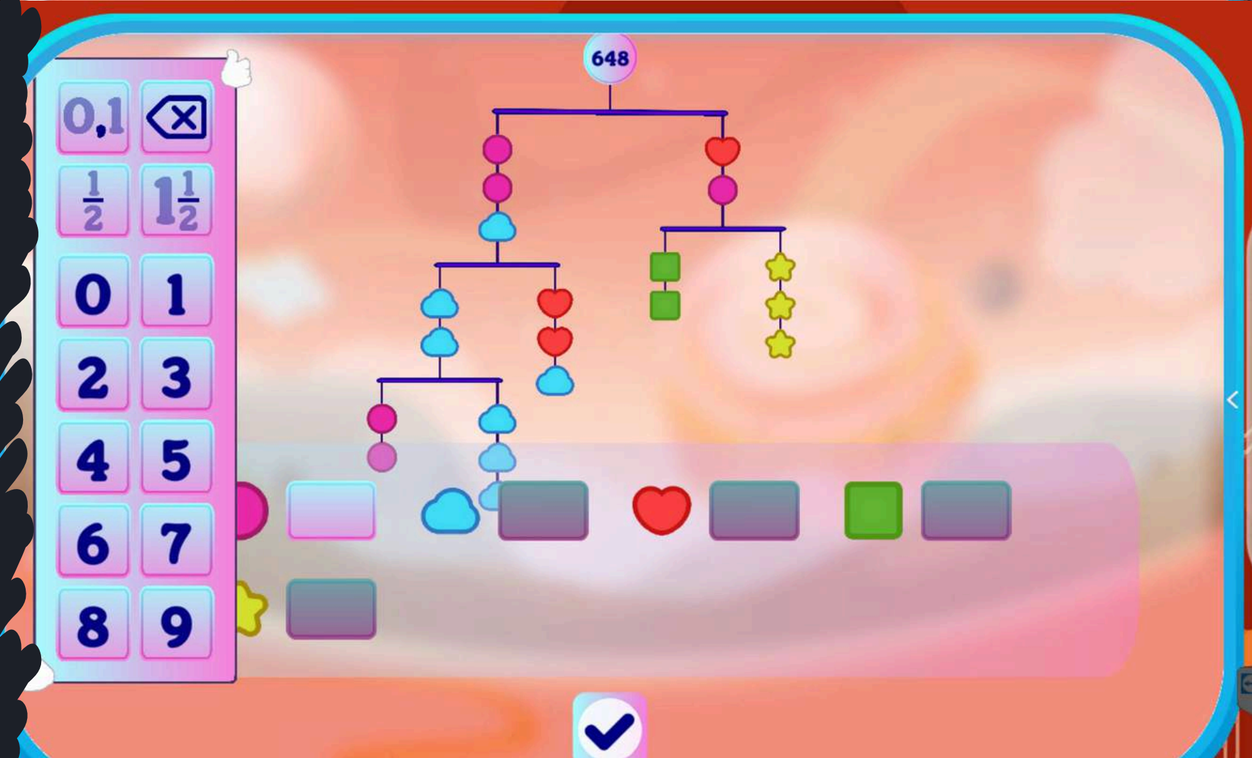


Logical weighing

The participant's task is to calculate the weight of all the weights hanging on the scale so that their total weight agrees with the one written above, and the weights hung on each side of the weighing beam are equal. To assign a value to a weight, click on the appropriate place next to the selected weight, then enter the value.
Attention, the keyboard works on a standard basis, pressing successive digits, the given field will change the value to tens, hundreds, thousands.
To save the value of a common fraction: click on the field next to the weight symbol, click on the given method of writing, then click on the place where the given digit should appear and on this digit. Repeat with other places in fractions. For decimal notation, first enter the number before the decimal point, then select the decimal point, and then the numbers after the decimal point. The value can be deleted by pressing the appropriate key on the keyboard. To save the value of another weight, press the field next to the selected weight. The value of weights can be changed any number of times. As the weights change, the scale will tilt in the appropriate direction, simulating the actual weight. It should be remembered that at the ends of each of the weighing beams there should be an even weight, and the beam itself should remain in a horizontal position.
The activity is successful when the values are entered correctly. Various solutions to the task are possible.

The levels differ in the number of elements on the scale or their increasingly complicated distribution on the scale. In subsequent levels, you may need to use fractions.



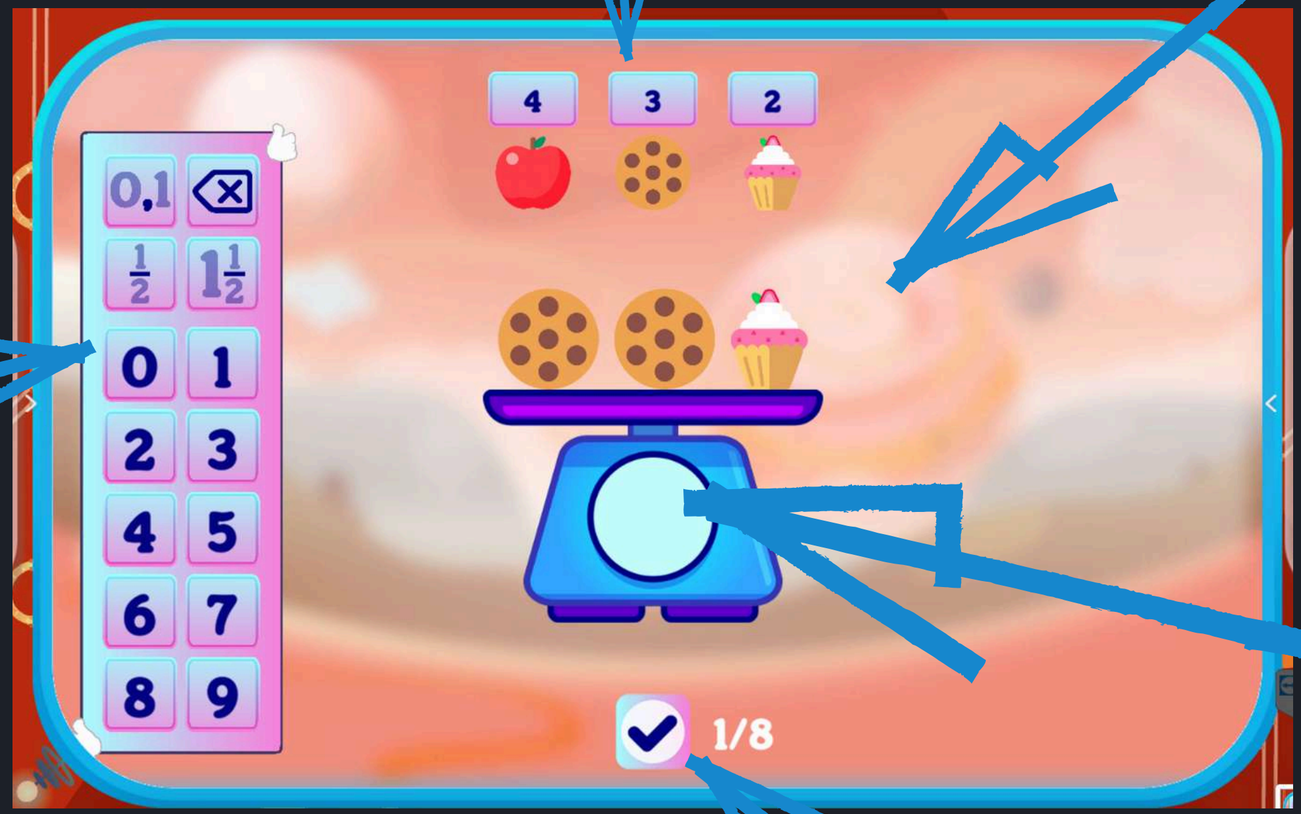


Mathematical operations:

addition, subtraction, multiplication, division, weighing, fractions, equations

How much does it weigh?

Legend:



How much does it weigh?

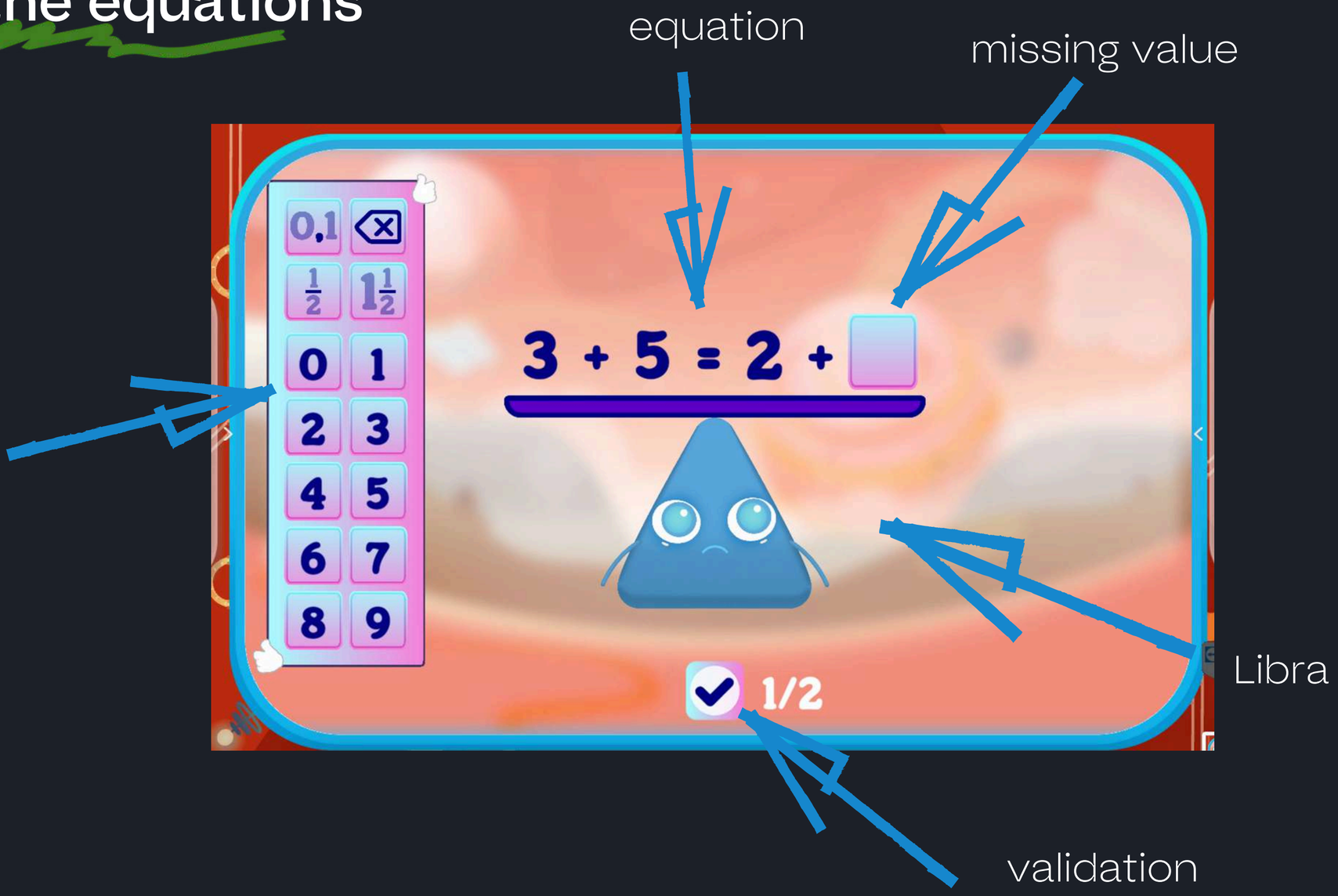
The participant's task is to write down the total weight of the elements on the scale, taking into account their value recorded in the table above.
To do this, click on the place where the weight is written, and then on the appropriate numbers on the keyboard. In order to save the value of a common fraction, you need to: click on the field next to the weight symbol, click on the given method of writing, then click on the place where the given digit should appear and on this digit. Repeat with other places in fractions. In the case of decimal notation, first write the number before the decimal point, then click on the decimal point, and then the numbers after the decimal point. The value can be deleted by pressing the appropriate key on the keyboard. It removes the last value. If the participant is sure of his answer, he clicks the "confirm" button. If the answer was correct, it will turn green and change the number of products on the scale. If it was wrong, it will highlight the field in red and you can continue to correct it.
After confirmation, a different pool of items will appear on the scale, but the table of values will remain the same. Within each table, the number of prepared products on the scale is plotted, given at the bottom, together with the number of correctly made examples. After completing all the examples, the activity will be successful. Clicking on the arrows or other activity in the application will change the table of values. This will also reset the number of correctly executed examples with the previous table.
The levels differ in the size of the given actions (Level 1 to 50, Level 2 to 100, Level 3 to 1000). Fractions may also appear in later levels.

Mathematical operations:

addition, multiplication, fractions

Weigh the equations

Legend:



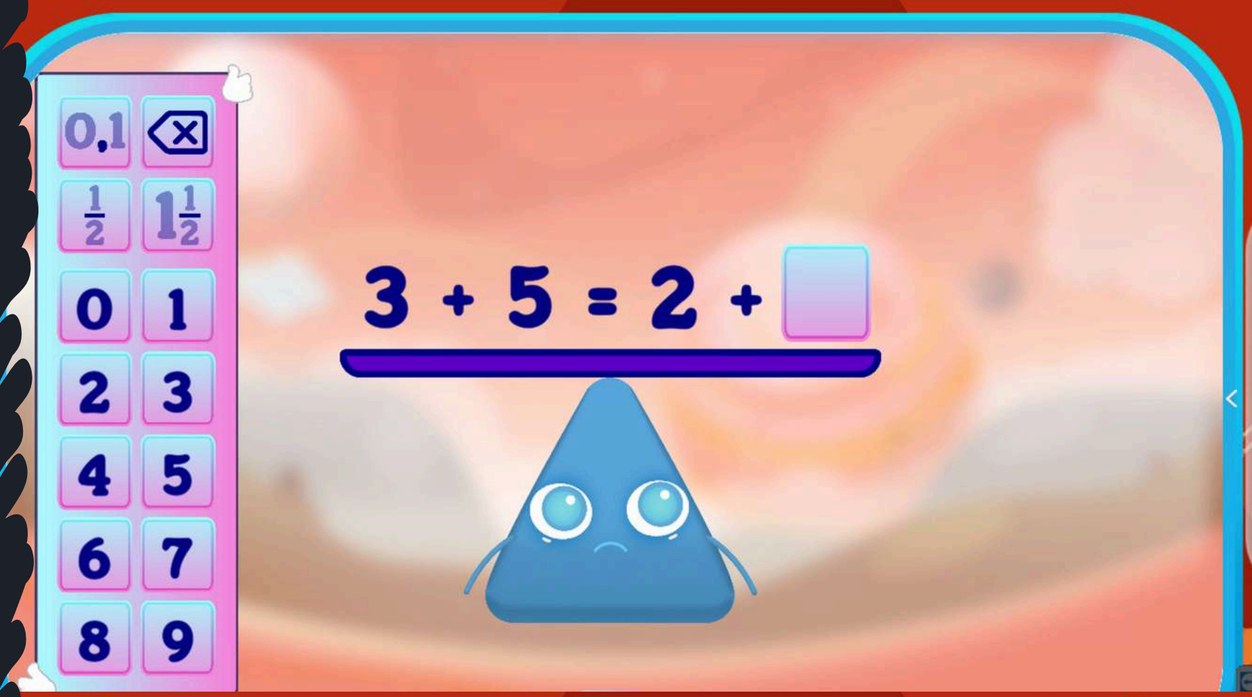
Weigh the equations

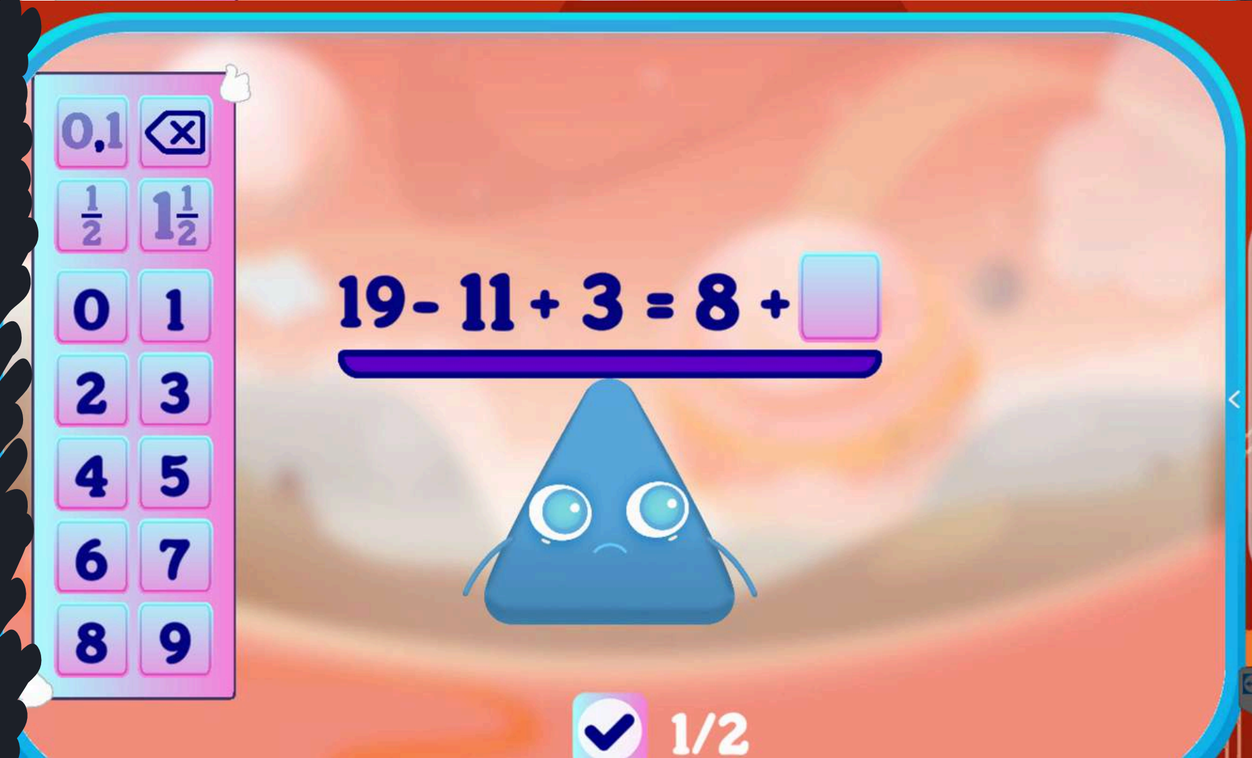
The participant's task is to complete the equation so that the values on both sides are equal.
To do this, enter the missing value. Click on the box and then on the calculated value. Attention, the keyboard works on a standard basis, so by pressing successive digits, the given field will change the value to tens, hundreds, thousands.
In order to save the value of a common fraction, you should: click on the field next to the weight symbol, click on the given method of writing, then click on the place where the given digit should appear and on this digit. Repeat with other places in fractions. In the case of decimal notation, first write the number before the decimal point, then click on the decimal point, and then the numbers after the decimal point.
The value can be deleted by pressing the appropriate key on the keyboard. It removes the last value. The value of weights can be changed any number of times. When the participant has set a value that he considers correct, he presses the "confirm" button.
The activity succeeds if it was valid. If it wasn't, it won't end and you can improve your score. In subsequent levels, the activity will be successful when it passes two or three more examples.

The levels differ in the size of the given actions (Level 1 to 50, Level 2 to 100, Level 3 to 1000) or the complexity of the equation. Fractions and percentages may also appear in further levels.

Mathematical operations:

addition, subtraction, multiplication, division, fractions, order of operations, equations

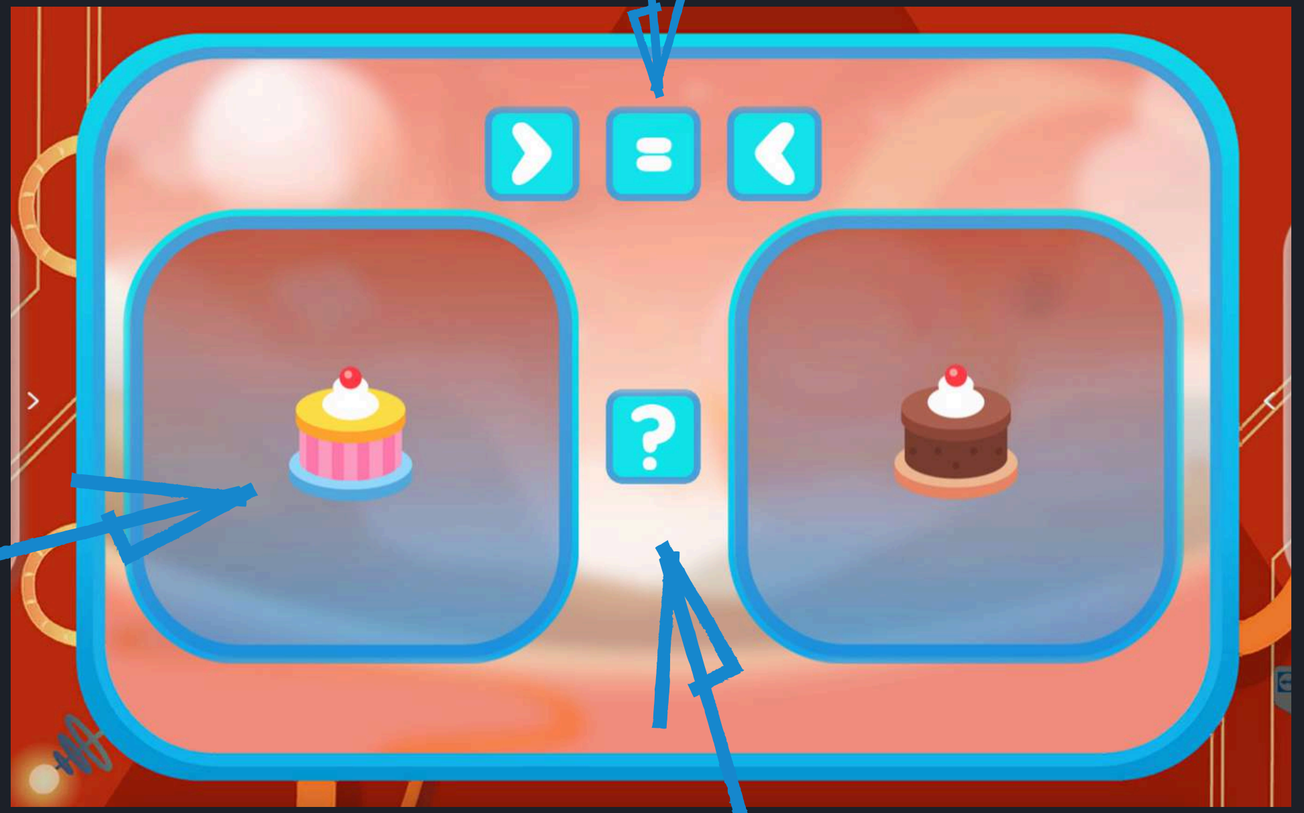




Compare the sets

Legend:

characters to use



elements
to compare

place to
character insertion

In the case of a two-player game, a timer and the number of correctly completed examples appear separately and independently on each side for students to compete against. Doubling an activity does not count twice in the score. At the end of time, a green smiley face appears on the side of the person with the most correctly solved activities. In case of a tie, it will appear on both sides. Participants can choose at the beginning which example they will do independently.

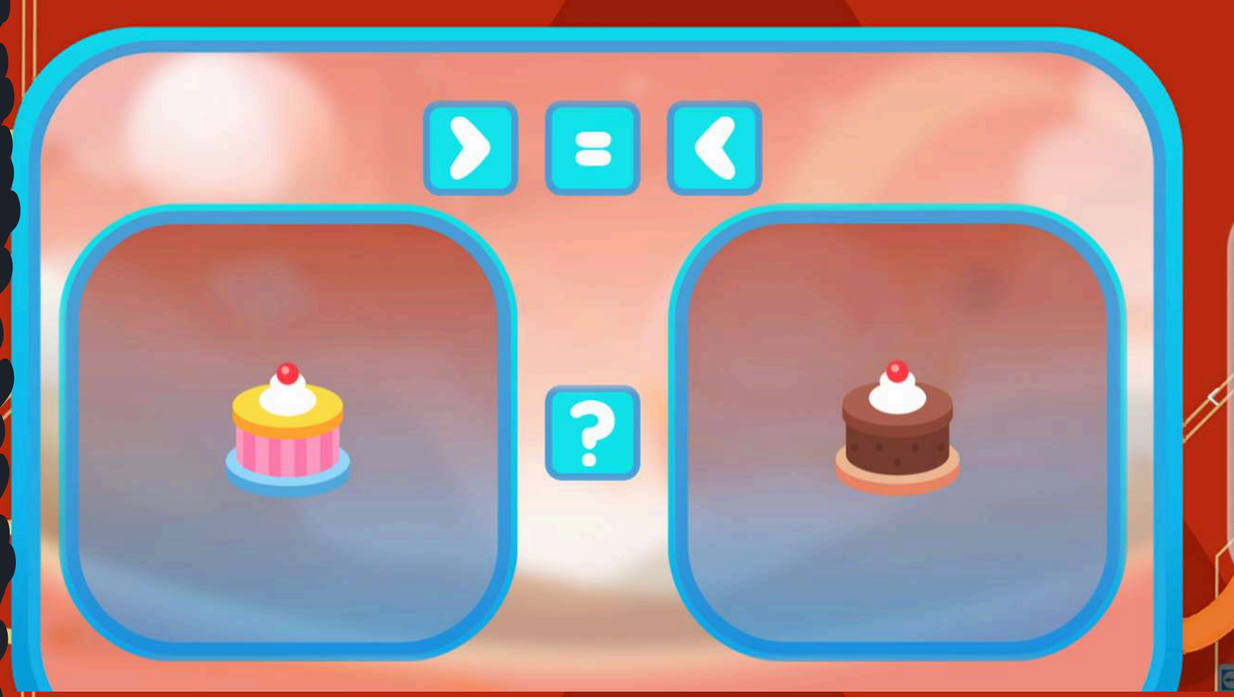
Compare the sets

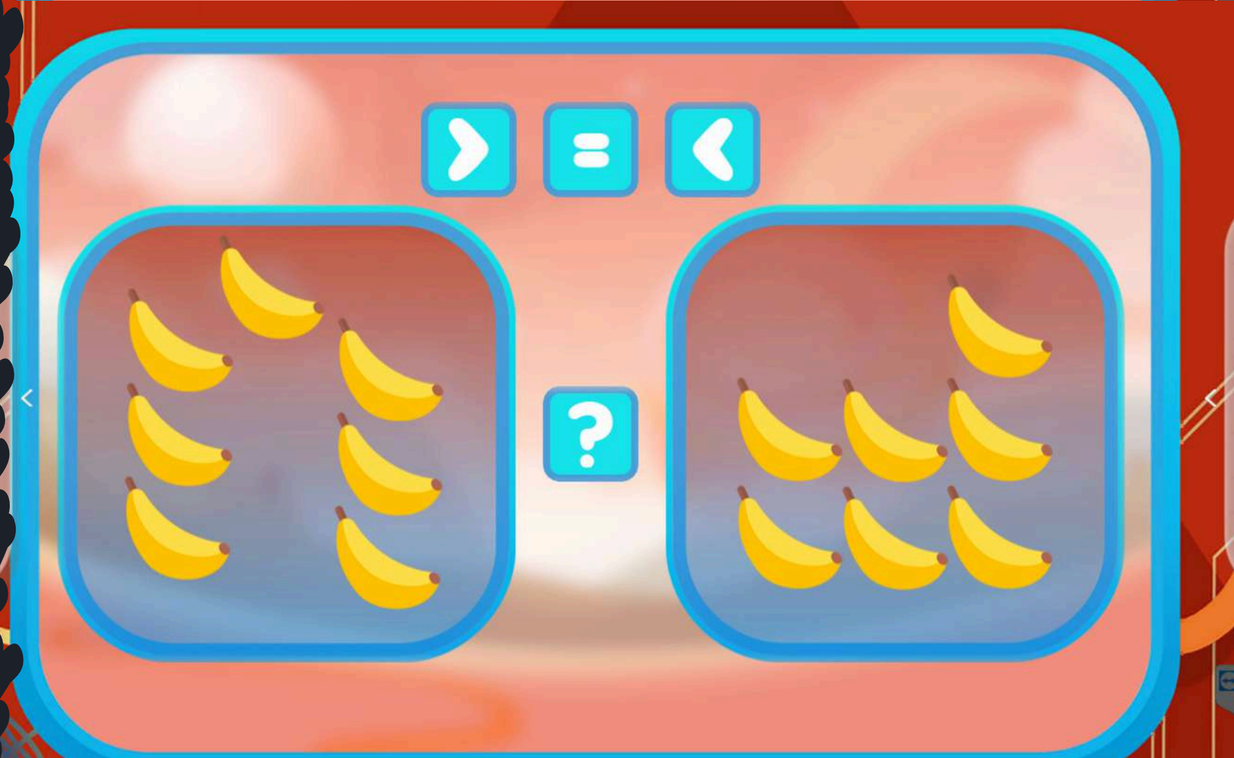
The task of the participant is to compare the number of elements of both sets and to insert an appropriate equal sign, greater than or lesser, between them. To do this, click on one of the signs above. The type of elements does not matter. If it is correct, the activity will be successful. If it is incorrect, the sets will be highlighted in red and the participant can correct the mark.

In Level 1 is to compare sets of elements. In Level 2, fractional values of these elements are added. Level 3 compares numbers, including fractions and percentages.

Mathematical operations:

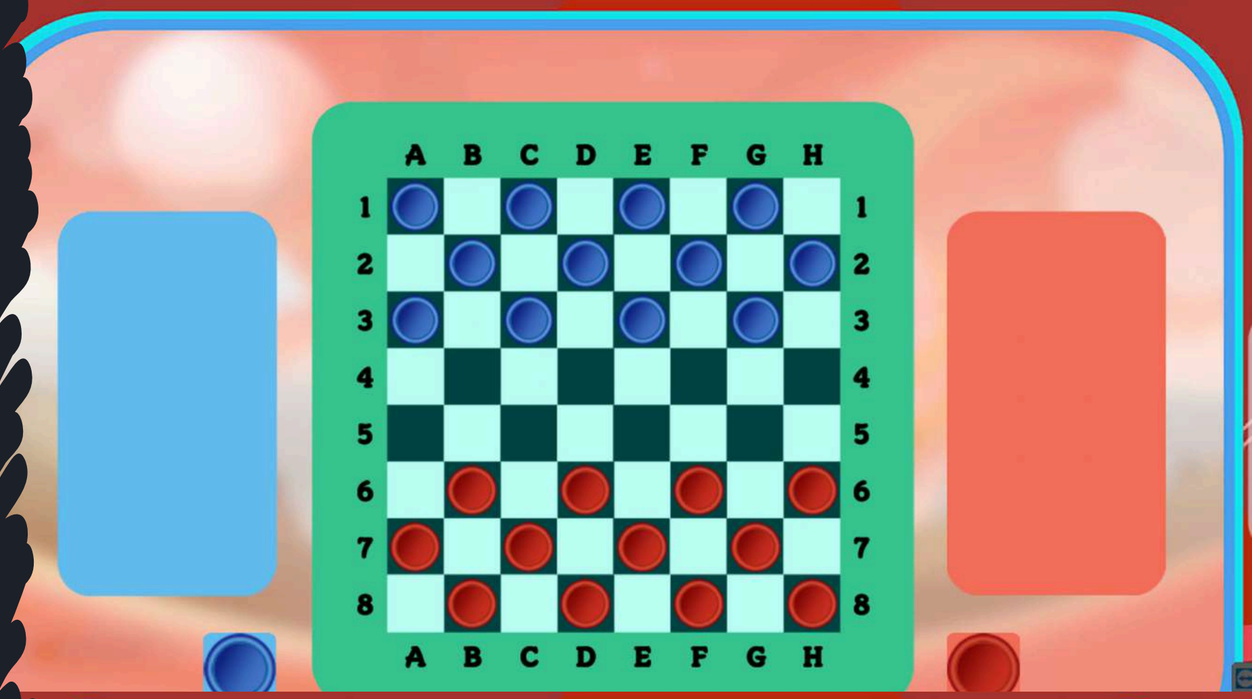
addition, fractions, percentages, sets, comparisons, equalities, majorities, minorities





Checkers

The application does not have built-in checkers rules, i.e. you can move the pawns to any field (also white or several fields in different directions) and in any order.
To move a pawn, click on the selected pawn, then on the selected place on the board. Pieces can be taken. If a pawn moves to a place that already has a pawn, it will be replaced. If the pawn is in the last row in the opponent's half, it turns into a queen. It doesn't change anything in the mechanics of moving. However, its graphics change.
The pawns can be placed on the rectangles on the sides of the board, respectively: red pawns on the blue rectangle and blue pawns on the red rectangle. Clicking on the rectangle and then on the field on the board will bring the pawn back into play.
If there are no pawns, you can add another one by clicking on the pawns placed at the bottom of the board, and then on the selected field on the board. There is no board showing a won game in the game.



Mathematical operations:

logical and strategic thinking, classic games

Multiplication

The task of the participant is to find the result in the multiplication table.
To do this, click on the row and column labels as indicated by the action. This will highlight the appropriate row and column so that when intersected they indicate the correct multiplication result. Multiplication by 1 is disabled.
Selection direction doesn't matter. If you label the column and row accordingly and indicate the result, the activity will be successful.

In the case of a two-player game, a timer and the number of correctly completed examples appear separately and independently on each side for students to compete against. Doubling an activity does not count twice in the score. At the end of time, a green smiley face appears on the side of the person with the most correctly solved activities. In case of a tie, it will appear on both sides. Participants can choose at the beginning which example they will do independently.

Mathematical operations:

multiplication up to 100

Reverse multiplication

The task of the participant is to indicate all possible multiplication operations that will lead us to the indicated result.
To do this, select the appropriate rows and columns by clicking on them, so that after their intersection, the given result is indicated. This will highlight the given row or column. The order in which actions are written is important. Multiplication by 1 is disabled. If we indicate all possible actions, then the activity is successful.
The number of actions required to be indicated is determined by the empty boxes displayed on the right.

In the case of a two-player game, a timer and the number of correctly completed examples appear separately and independently on each side for students to compete against. Doubling an activity does not count twice in the score. At the end of time, a green smiley face appears on the side of the person with the most correctly solved activities. In case of a tie, it will appear on both sides. Participants can choose at the beginning which example they will do independently.

Mathematical operations:

multiplication up to 100

Planet in Education

Core Curriculum for Kindergarten

Knowla

Cognitive area of child development. A child ready to start school:

- answers questions, tells about events from kindergarten, explains the order of events in simple picture stories, composes picture stories, recites poems, composes and solves puzzles;
- experiments with rhythm, voice, sounds and movement, developing his musical imagination; listens, plays and creates music, sings songs, moves to music and to music, notices changes in the character of music, e.g. dynamics, tempo and pitch, and expresses it with movement, reacts to signals, makes music using instruments and other sound sources; sings songs from children's repertoire and easy folk songs; willingly participates in collective music-making; expresses emotions and non-musical phenomena with various means of musical activity; actively listens to music; performs or recognizes melodies, songs and songs, e.g. important for all children in kindergarten, e.g. kindergarten anthem, characteristic for national celebrations (national anthem), needed to organize celebrations, e.g. other; listens to music intently;
- expresses creative expression during construction and play activities, develops space by giving meaning to objects placed in it, determines their location, number, shape, size, weight, compares objects in their environment due to the selected feature;
- 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);
- experiments, estimates, predicts, measures the length of objects using, for example, a hand, foot, shoe;
- counts elements of sets during play, cleaning, exercises and other activities, uses cardinal and ordinal numbers, recognizes digits representing numbers from 0 to 10, experiments with creating consecutive numbers, performs addition and subtraction in a practical situation, counts objects , distinguishes incorrect from correct counting;

Core Curriculum for early school grades I-III

IMath education.

- Achievements in understanding spatial relations and size characteristics. The student compares objects in terms of a distinguished size feature, e.g. length or weight; classifies objects;

- Achievements in understanding numbers and their properties. Pupil: counts (forwards and backwards) from the given number by 1, by 2, by 10, etc.; reads and writes, using digits, numbers from zero to a thousand and selected numbers up to a million (e.g. 1,500, 10,000, 800,000); compares numbers; orders numbers from least to greatest and vice versa; understands expressions such as: number 7 higher, number 10 lower; uses signs: <, =, >.

- Achievements in the use of numbers. Student: explains the essence of mathematical operations - addition, subtraction, multiplication, division and the relationships between them; uses the properties of actions intuitively; adds to the given number in memory and subtracts from the given number in memory: single-digit number, number 10, number 100 and multiples of 10 and 100 (in simpler examples); multiplies and divides in memory in terms of the multiplication table; multiplies by 10 numbers less than 20; solves equations with the unknown written in the form of a window (completes the window); uses own strategies when performing calculations; uses the equals sign and the signs of the four basic operations; adds and subtracts two-digit numbers, saving partial results of operations if necessary or, performing operations in memory, immediately gives the result; calculates sums and differences of larger numbers in simple examples like: 250 + 50, 180 - 30; multiplies two-digit numbers by 2, saving partial results if necessary; uses its own strategies in calculations.
- Achievements in reading mathematical texts. The student: analyzes and solves simple and selected complex word problems; recognizes a mathematical problem and creates its own strategy for solving it, appropriate to the conditions of the task; describes the solution by means of operations, equality with a box, a drawing or any other way of his choice; arranges tasks and solves them, creates mathematical puzzles, uses his/her own artistic, technical and construction activity in this process; selected activities are carried out using simple computer applications.
- Achievements in understanding geometric concepts. The student: recognizes - in the natural environment (including spatial figures on the walls) and in drawings - geometric figures: rectangle, square, triangle, circle; distinguishes these figures from other figures; draws lines and broken lines with a ruler; draws freehand rectangles (including squares) using a square lattice;

Achievements in the use of mathematics in life situations and in other areas of education. The student: classifies objects and various elements of the social and natural environment due to the distinguished features; notices the rhythm in the natural environment, applied art and other human products present in the child's environment; reads the hours on a clock with hands and an electronic clock (displaying numbers in the 24-hour system); performs simple time calculations; uses units of time: day, hour, minute, second; uses a stopwatch, phone, tablet and computer applications; saves the date of e.g. his birth or the current date; uses a calendar; reads and writes Roman characters at least until the 12th century; makes estimates in various life situations; weighs; uses terms: kilogram, decagram, gram, ton; knows the relationships between these units; measures fluids; uses the terms: liter, half a liter, quarter of a liter; uses checkers, chess and other board or logical games to develop strategic and logical thinking skills, understanding of rules, etc.; transforms games by creating its own strategies and organizational rules; uses the acquired skills to solve problems, create creative activities and explore the world, taking care of their own development and creating individual learning strategies.

Core Curriculum for grades IV-VI

- Accounting efficiency. Performing simple calculations in memory or in more difficult writing activities, and using these skills in practical situations. Verifying and interpreting the results obtained and assessing the reasonableness of the solution.
- Use and creation of information. Reading and interpreting data presented in various forms and their processing. Interpretation and creation of mathematical texts and graphical presentation of data. Using mathematical language to describe reasoning and results.

- Using and interpreting representations. Using simple, well-known mathematical objects, interpreting mathematical concepts, and manipulating mathematical objects. Choosing a mathematical model for a simple situation and building it in various contexts, also in a practical context.
- Reasoning and argumentation. Carrying out simple reasoning, giving arguments justifying the correctness of reasoning, distinguishing evidence from example. Noticing regularities, similarities and analogies and formulating conclusions based on them. Applying a strategy resulting from the content of the task, creating a strategy for solving the problem, also in multi-stage solutions and in those that require the ability to combine knowledge from various branches of mathematics.

- Natural numbers in decimal positional system. Student: writes and reads multi-digit natural numbers; interprets natural numbers on a number line; compares natural numbers;
- Operations on natural numbers. Student: adds and subtracts two-digit or greater natural numbers in memory, adds a single-digit number to any natural number and subtracts from any natural number; adds and subtracts multi-digit natural numbers in writing and using a calculator; multiplies and divides a natural number by a one-digit, two-digit or three-digit natural number in writing, in memory (in the simplest examples) and using a calculator (in the more difficult examples); uses convenient methods to facilitate calculations, including commutativeness and connection of addition and multiplication as well as distributiveness of multiplication with addition; compares natural numbers using their difference or quotient; calculates squares and cubes of natural numbers; applies rules regarding the sequence of actions; estimates the results of activities; answers questions about the size of sets of different types of numbers among numbers from a small range (e.g. from 1 to 200 or from 100 to 1000), as long as the number in the answer is small enough that the student can write out all the considered numbers;

- Integers. Student: gives practical examples of using negative numbers; calculates absolute value; compares integers; performs simple memory calculus on integers.
- Fractions and decimals. The student: describes a part of a given whole using a fraction; represents a fraction as a quotient of natural numbers, and a quotient of natural numbers as a fraction; shortens and extends fractions; reduces common fractions to a common denominator; shows improper fractions as a mixed number and a mixed number as an improper fraction; writes binomial expressions as decimals and vice versa; write finite decimal fractions as fractions; converts fractions with denominators that are divisors of 10, 100, 1,000, etc. into finite decimal fractions by any method (by expanding or reducing fractions, dividing the numerator by the denominator in memory, in writing or using a calculator);
- Operations with fractions and decimals. The student: adds, subtracts, multiplies and divides fractions with one- and two-digit denominators, as well as mixed numbers; adds, subtracts, multiplies and divides decimal fractions in memory (in the simplest examples), in writing and using a calculator (in the difficult examples); performs uncomplicated calculations in which fractions and decimals occur simultaneously; compares fractions using their difference; calculates the fraction of a given integer; calculates squares and cubes of common and decimal fractions and mixed numbers; calculates the value of simple arithmetic expressions by applying the order of operations rules; performs operations with decimal fractions using own, correct strategies or using a calculator; calculates the values of arithmetic expressions that require the use of arithmetic operations on integers or numbers written using fractions, mixed numbers and decimals, including negative rationals, with a degree of difficulty no greater than in the example

- Elements of algebra. The student: uses uncomplicated patterns with letter markings, describes the pattern in words; applies letters to unknown numbers and writes simple algebraic expressions based on information embedded in a practical context, for example, writing the perimeter of a triangle; solve first-degree equations with one unknown on one side of the equation (by guessing, completing or doing the opposite) VII. 1, 4, 5. Polygons, circles and circles. The student: recognizes and names acute-angled, right-angled, obtuse, equilateral and isosceles triangles; recognizes and names: square, rectangle, rhombus, parallelogram and trapezoid; knows the most important properties of a square, rectangle, rhombus, parallelogram and trapezoid, recognizes axisymmetric figures and indicates the axes of symmetry of figures;
- Practical calculations. The student: interprets 100% of a given quantity as a whole, 50% - as a half, 25% - as a quarter, 10% - as a tenth, 1% - as one hundredth of a given numerical quantity; in cases embedded in a practical context, calculates the percentage of a given value in the difficulty level of 50%, 20%, 10%; performs simple clock calculations on hours, minutes and seconds;
- Text tasks. The student: sees the relationship between the given information; divides the solution of the task into stages, using its own, correct, convenient solution strategies; to solve tasks embedded in a practical context, uses the acquired knowledge in the field of arithmetic and geometry as well as acquired calculation skills, as well as own correct methods; verifies the result of a text task, evaluating the reasonableness of the solution, e.g. by estimating, checking all the conditions of the task, evaluating the order of magnitude of the result obtained; arranges tasks and puzzles, solves them; poses new questions related to the situation in the solved task.

The planet in educational practice

Knowla

Remember before it disappears

Knowla's Activity: Count the figures

The whole thing consists of two phases. During the first one, children perform the actual task of the application, i.e. they count the figures in the picture. They can write the number down in their notebook. At the end, instruct them to look closely at the figure. Then you can switch the picture, and the task of children is to reproduce the previously seen graphics as accurately as possible. At the end, the whole group checks to what extent they agree.

Stealing apples

Knowla’s Activity: Counting the set

Two people take part in the game. Each should get their own pen. The task of the first one is to flip as many fruits to obtain the equality indicated above and to confirm the number with the button. The task of the second person is to prevent the first from achieving this goal. This can be done e.g. throwing more fruits than expected, stealing elements. It is worth setting a time when these people will compete with each other. After the end of the turn, the players change.

It’s smart to play.

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

Knowla