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# Objective:

With Math box 7, children can learn the following in a playful way:

- Comparing quantities up to 20 (more less, equals).
- Working with the comparison strips of 1-20.
- Counting up to and including 10 and 20.
- Working with the numbers 1-20.
- Working with the number strips up to 20.
- Working with a matrix.
- > Simple mathematical operations (additions subtractions) up to 20.

## Contents Math box 7:

- > A box with a lid. The lid also functions as a matrix.
- 40 chips: 20 red and 20 yellow.
- ▶ 80 Shapes:
  - 20 Squares.
  - 20 Triangles.
  - 20 Rectangles.
  - 20 Circles.
- > 5 Shape cards: square, triangle, rectangle, circle, chip.
- ▶ 8 Comparison strips.
- > 4 Numbers strips: 1-5, 6-10, 11-15, 16-20.
- > 20 Number cards: 1-20.
- ▶ 4 "+" symbols.
- ▶ 4 "-" symbols.
- ▶ 4 ">" symbols.
- ▶ 4 "=" symbols.
- > 10 Assignment cards, the matrix printed on both sides, also up to 20.

## Methods:

The goal of Math box 7 is clear, yet it can be reached in many different ways. Math box 7 can be used as playing materials, developmental materials, and learning materials. In fact, there is no fixed order. There is a balance between the extent to which children can make their own choices and the support from the teacher. Make sure that the children always respect the materials. The materials should remain appealing and last a long time.

It can be useful to let the children play separately with the comparison strips, counting objects, matrix, and operations.



# Playing materials

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Children can experiment freely and in their own way with Math box 7. As a result, children have the freedom to explore possibilities and discover relationships themselves.

- Ask the children to experiment with the numbers strips up to 20 (i.e., very long rows). They can also use the symbols "<", ">" and "=". In addition, children can place the numbers above or below the number strips.
- > Let the children play and experiment with the numbers strips 1-20 and the numbers 1-20. They can count and compare.



Ask the children to experiment with the matrix. You can place the shape cards and numbers around the matrix. Can the children find a connection between the matrix, shape cards, and numbers? And if the children find where they connect, what can they place there? You can use all 25 positions to create sums, both concretely and abstractly. Where will you start?

**Support** the children by playing together with them, showing them how to play, or by setting a good example. The teacher can also introduce his or her own creative ideas in the game.

# Developmental materials

Let the children learn independently. They can take the materials out of the cupboard themselves and order the materials. With the comparison strips, number strips, and the matrix, a variety of games and assignments can be invented in which thinking plays a central role.

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Here, we give an example of how children can come up with and solve problems together.

You can actually see two "sums". If you remove one object, then do you still know how to solve the sum?

**Support** the child when he or she needs it or asks for it. You can point out characteristics or patterns: different ways to represent numbers, to compare in chunks of 5, 10, or 20, comparison strips up to 20, numbers of to 20, and simple operations up to ten. Accompany assignments that children can carry out themselves with a clear explanation.







### Working with the numbers I-20

This exercise can be done with the numbers 1-20.

Counting with the number strips



Depending on the children's skill level, they can either use one strip (1-5) or both strips (1-10). The same goes for the strips of 11-15 and 16-20. The sequence of the numbers on these strips is fixed. With the strips, children can do the following:

- Sort the objects;
- Look for the same number cards.

#### Comparing with the comparison strips up to 20



Ask a child to place the comparison strips side by side. Take any quantity of objects out of the box that represent two different shapes (e.g., squares and triangles). Let a child place the shapes on the comparison strips. For example, place the squares on one strip and the triangles on the other strip. The child can now directly see whether there are more objects of one shape than the other, or whether there are an equal number of objects for both. The child can also place the number cards above the comparison strips, place the objects in the correct quantities on the strips, and then learn what "more" and "less" mean.

Working with the mathematical symbols



When children work with the mathematical symbols, then they can learn about "more" and "less" and match quantities to symbols. By combining quantities, or reducing a quantity, children learn to understand what additions and subtractions entail. You can then also place the symbols for additions and subtractions on the table. The symbols determine which mathematical operation can be carried out: more, less, equals, addition, or subtraction.

There are a number of cards that feature an assignment with the mathematical symbols, but of course there are countless other possibilities. Both teachers and children can come up with new ideas.



## 2 Working with the matrix

Let the child place the shape cards on the matrix (i.e., the lid). Below the shape cards on the matrix, the child can now place random quantities of objects. The game becomes more challenging when the numbers cards are placed above the matrix.

The matrix offers countless other possibilities. Below, we show how a child can work with both concrete and abstract operations. The "=" and "=" symbols are operators, namely the symbols that you use to create operations (i.e., sums). In fact, you can use concrete shapes, more abstract chips, or simply numbers. The "=" and "+" symbols can be moved up and down: it always shows "1 + 2 = 3". Additionally, the symbol can be changed to a "<" or ">" symbol, or even a "-" symbol. This way, the children can make sums not only with the concrete objects, but also with the abstract numbers. The teacher can also show how you can gradually move from concrete to abstract. See also the assignment cards.







### 3 Working independently with the assignment cards

To promote working independently, the game includes ten assignments cards. The front of the cards feature an assignment, whereas the back can be used to check the answers. There are cards with assignments for the comparison strips and cards with assignments for the matrix (i.e., the lid).

The assignment cards show the child what materials to use. When the child has completed the assignment, then he or she can check the answer with help of the back of the card.





Of course, the children can also come up with their own assignments. For example, they can place the cards next to the matrix in a different order. The comparison strips can also be used to come up with many new assignments.





### Playing and working together

Math box 7 offers many possibilities to work alone, but children can also play and work together with another child. For example, they can:

- Use the comparison strips and accessories;
- Use the matrix and accessories;
- Create operations, such as the examples below.

#### Working together with the comparison strips

Place any number of chips on the comparisons strips, as long as there are more than ten on each, such as "12" and "15". Also add the "<" symbol.

Let 2 children place a number of objects on the comparison strips. They count the objects, place the corresponding numbers below the strips, and look for the correct symbol. There are countless possibilities and children can inspire each other when they play. Ask the children to check their answer together.

#### Working together with the matrix

The matrix has 25 positions and can be used to visualize assignment related to more, less, plus, minus, and equals. Furthermore, the children can remove objects and practice with missing elements. This can result in real challenges.





MATH BOX 7

Instructions



### 5 Possibilities

### Working together with a screen

The lid of Math box 7 can be used as a screen. Behind the screen, you can create an assignment. Ask child 1 to make a sequence, such as the numbers 5, 7, 8, and 10. The child now says the sequence out loud. Can child 2 copy the sequence? Together, the children check the answer.

Child 1: Place 3 squares, and next to that 5 triangles, 7 rectangles, and 1 chip. Follow the same procedure.

Child 1: I put down 3 chips. Add another one, and another one.

Child 1: Take two comparison strips up to 10. Then, put the number 7 under one and the number 9 under the other. Ask child 1 to put down the correct number of chips. Together, the children check the answer. Which strip has fewer chips? Place 5 numbers: 2, 4, 6, 8, 10. Child 2 does the same on his side of the screen. Now take away the screen and compare the sequences.

Children can endlessly try to come up with new assignments and challenge each other.

Do not forget to use the existing assignments. One child can explain the assignment on the card to the other child, who can then try to find a solution.

### Combinations with other boxes

All Math boxes can be combined. This can result in exciting new assignment and activities.

Examples:

Take 2 consecutive game boards from Math box 4. Add the number 5. Then place 5 game boards with consistent differences. If you want to play with differences in width and shades of colour, you can also use Math box 5: take 2 game boards from Math box 5 in 2 different shades of colour. Again, add the number 5. The child now tries to sort the 5 game boards on the basis of their colour shades. You can play the same game with different widths.

Put down 9 dots and place the block card from Math box 4 next to them. The child can now try to sort the 9 blocks in a sequence from high to low.

This way, the children can come up with a variety of assignments and challenge each other.

Similarly, you can use the assignment cards and numbers.



This represents a "sum". Put down 8 cylinders from narrow to wide. The children can work together to come up with "sums" and can then try to "read" the "sums".



# Learning materials

The teacher shows how the game can be played and the child imitates the teacher. This teaches the child about the characteristics of the material and how it is organized. The latter is especially important for children that find it difficult to work independently and take initiative.

**Support:** Show how an activity can be done, possibly even do it together with one of the children, and articulate what the child does and what you do yourself.

- Place the materials in front of the child. Use the correct terms, although the child does not have to know these him or herself: "This is a matrix. Here, I can place 5 shapes, and on top some numbers. You have to pay attention to the shapes that you see, but also how many there are. You then have to put them in the correct square. Do you want to try it? Here, you see the shapes and here, on top, you see the number. Can you place that many squares in the correct place?"
- Place the 2 x 4 comparison strips under each other. Count the number of slots. How many do you see? The correct answer is 20. Place a chip in every slot. How many chips have you put down? Do the same for the other comparison strip. How many chips should there be? Now you can place the corresponding number under the comparisons strips. Could you play this game by yourself?
- > Articulate the actions of the child.
- "Let's check together whether your answer is correct. Does every row contain the same number of chips? Did you add the correct number to it?"
- > Repeat the assignments and ensure variation.













