

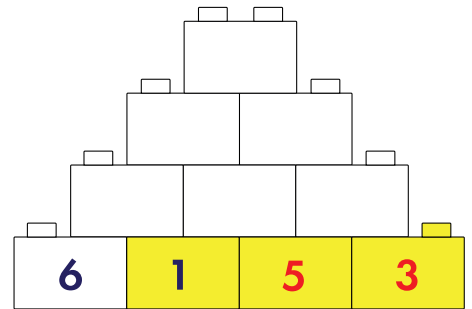
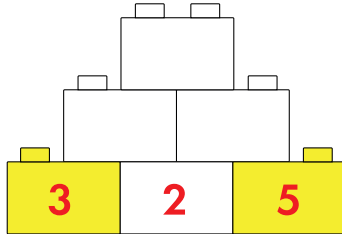
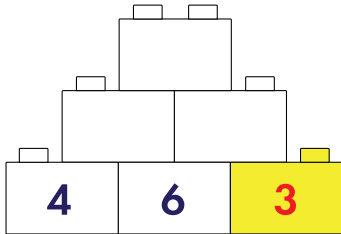
# 1

## Researcher task: Building number pyramids

Individual or pair work

1. Select three (four, five) blocks with numbers smaller than 10 as foundation blocks.

Example:



2. Build a number pyramid with these foundation blocks.
3. Draw the number pyramid.
4. Can you build different number pyramids with the same foundation blocks?  
How many different ones can you build?
5. Write down what you found out.




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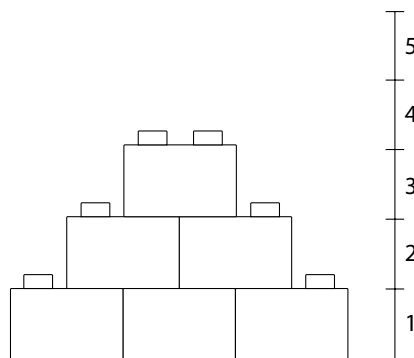
# 2

## Researcher task: High number pyramids

Individual or pair work

1. Build number pyramids as high as possible.

Example:



*This is a pyramid of 3  
(height: 3 blocks).*

2. My highest number pyramid is  blocks high.
3. Draw the number pyramid.

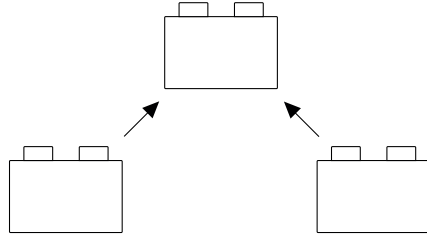
# 3

## Researcher task: Build backwards

Individual, pair or group work

1. Select a block as the target block.
2. Build a number pyramid with this target block.

Example:



3. Search for other possible number pyramids with this target block.
4. Consider: Are there pyramids of different heights with the same target block?
5. Write down what you found out.



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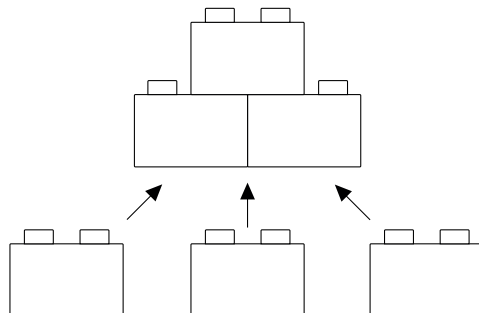
# 4

## Researcher task: From top to bottom

Individual or pair work

1. Select a block as the target block.
2. Continue building below the target block with matching blocks.

Example:



3. How high will the number pyramid be?
4. Think about how you can build really high number pyramids.
5. Draw the number pyramids. Write down what you found out.



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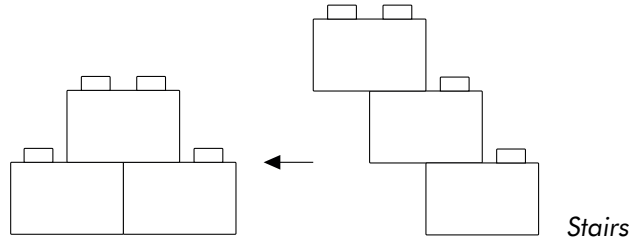
# 5

## Researcher task: Building sideways

Individual or pair work

1. Build a small number pyramid from three blocks.
2. Now build a staircase from blocks on the side.

Example:



3. Build another staircase sideways. How is it different from the one you built before?
4. Write down what you notice. What target blocks do you get? How many stairs can you build?




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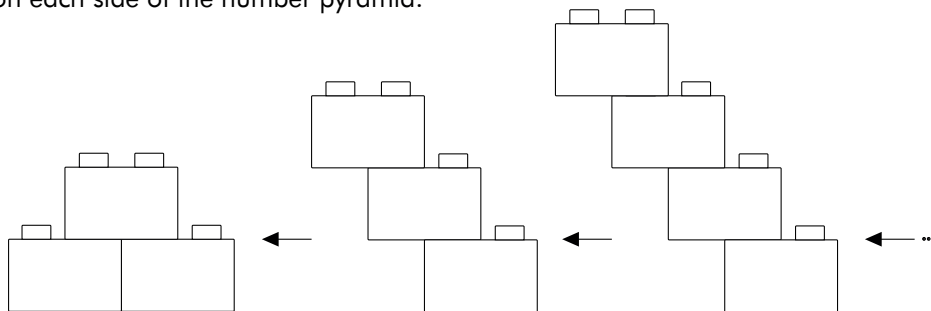
# 6

## Researcher task: Building sideways in alternation

Pair work

1. Build a small number pyramid from three blocks.
2. Give the finished number pyramid to your partner, you get theirs in return.
3. Build a staircase on each side of the number pyramid.

Example:



4. Swap the number pyramid again and alternately build new stairs on the side.
5. How often can you add new stairs to the side of the number pyramid?




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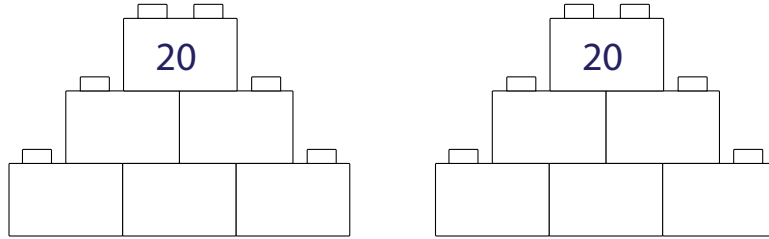
# 7

## Researcher task: Compare number pyramids

Pair work

1. Select two identical target blocks with your partner.
2. Build two number pyramids of the same height with these target blocks.

Example:



3. Compare your number pyramids.
4. Do the two number pyramids differ from each other? If so, how? Write down what you notice.



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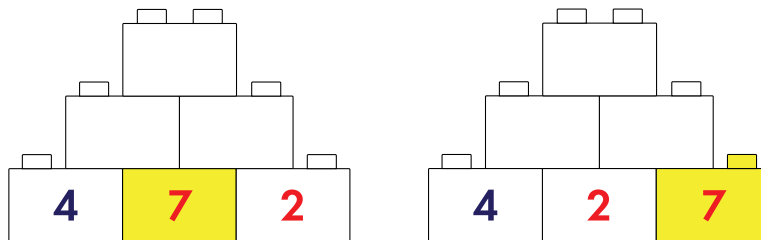
# 8

## Researcher task: Same foundation blocks

Pair work

1. Select three (four, five) numbers up to 10 as foundation blocks.
2. Use them to build as many number pyramids as possible. To do this, keep arranging the foundation blocks differently.

Example:



3. Which numbers do the target blocks show?
4. Write down what you notice.



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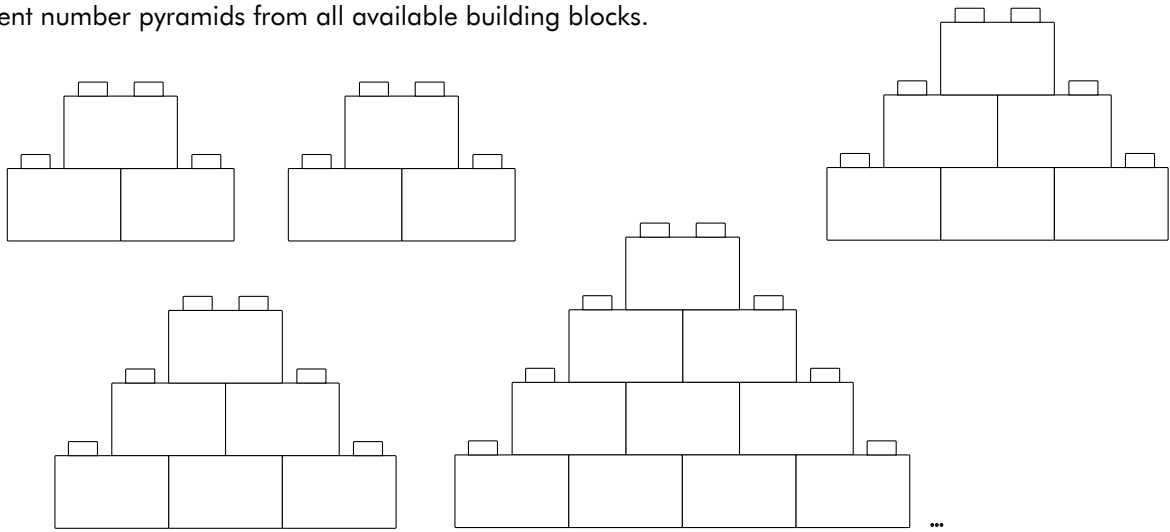
# 9

## Researcher task: Using all blocks

Group work

1. Build different number pyramids from all available building blocks.

Example:



2. How many number pyramids have been created?
3. Draw all the different number pyramids.



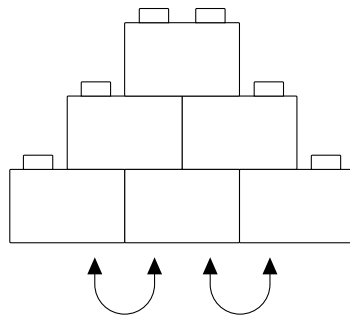
# 10

## Researcher task: Changing number pyramids

Individual or pair work

1. Build a number pyramid from three (four, five) foundation blocks.
2. Swap all the building blocks with each other. Which other blocks do you have to change?  
How many at least? How many at most? Do you always have to change the same blocks?
3. What happens if you swap only two foundation blocks?
4. Write down what you notice.

Example:




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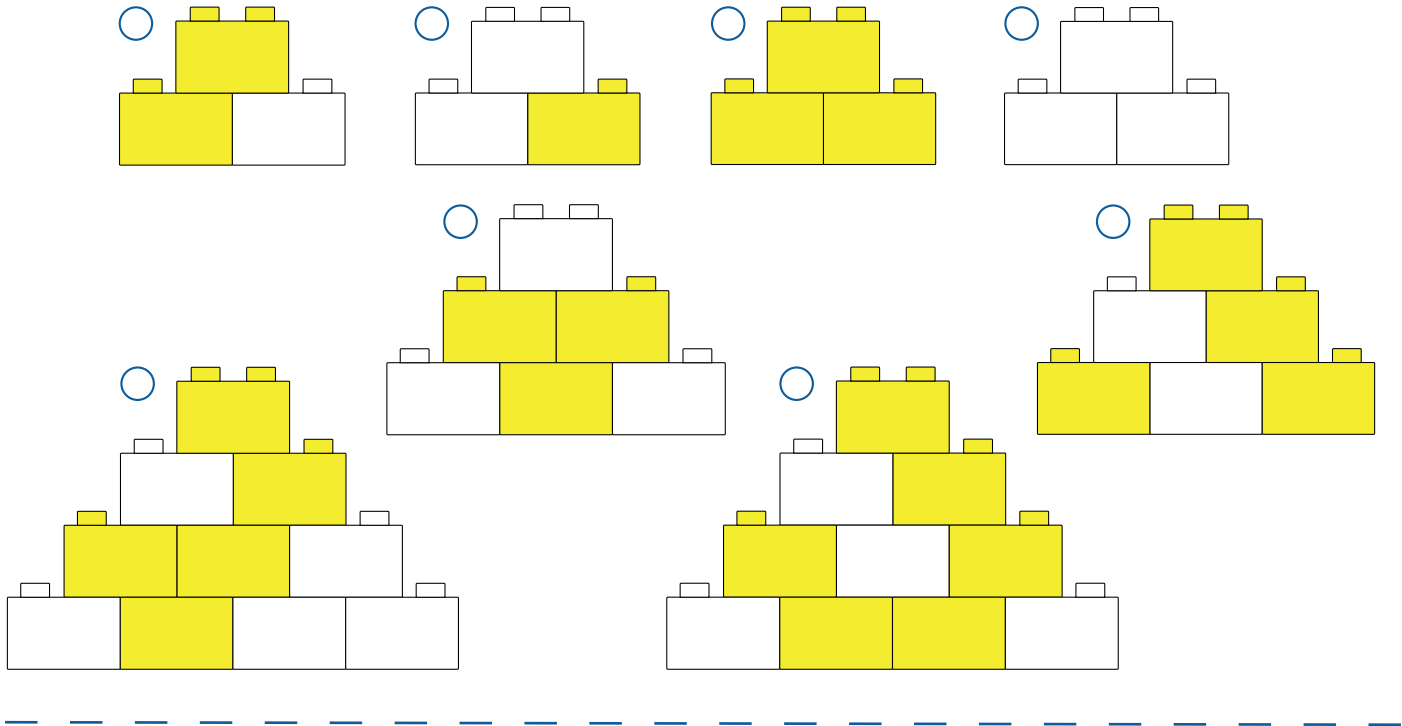
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# 11

## Researcher task: Building patterns

Individual or pair work

1. Build number pyramids with patterns of yellow and white blocks.
2. Which of these number pyramids can you build? Tick off the possible patterns.



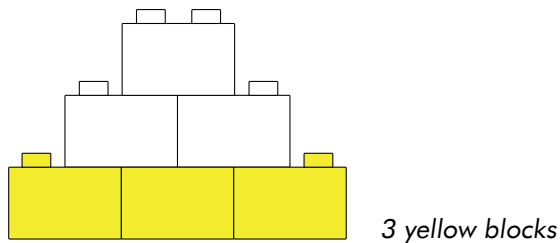
# 12

## Researcher task: Yellow, yellow, yellow

Individual or pair work

1. Build a number pyramid. Use as many yellow blocks as possible.

**Example:**



2. Which of your number pyramids contains the most yellow blocks? Draw the number pyramid.  
My record:    yellow blocks

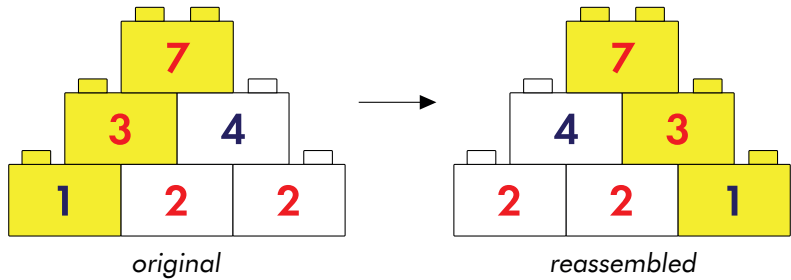
# 13

## Researcher task: Set up, take down and build up

Pair work

1. Everyone builds a number pyramid and draws them.
2. Take both number pyramids apart again.
3. Pass the blocks used in each case to your partner.  
Will he or she be able to assemble a number pyramid from them?

Example:



4. Compare your original number pyramid with your partner's reassembled number pyramid. What do you notice?



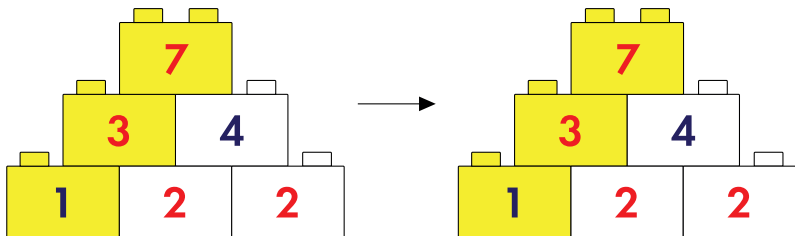
# 14

## Researcher task: Number pyramids betting game

Pair or group work

1. Take turns building a number pyramid with the same number of blocks. Your partner watches.  
Draw the number pyramid.
2. Take both number pyramids apart again and pass the used blocks to your partner.
3. Record the time: how fast can your partner reassemble the original number pyramid without help?
4. Explain what to look for in building pyramids quickly.

Example:



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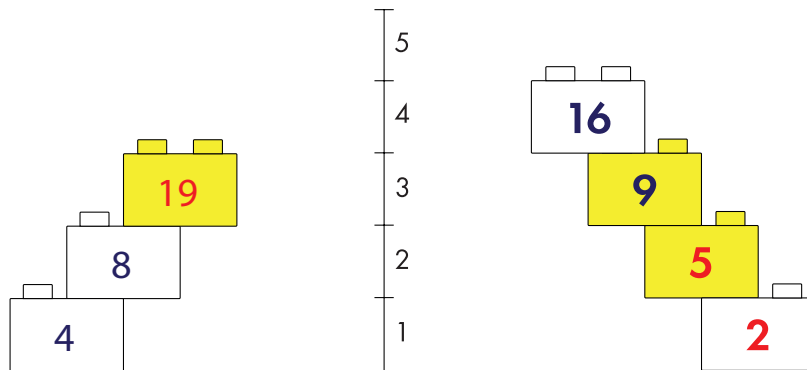
# 15

## Researcher task: Underpinning stairs

Individual or pair work


1. Select any three (four, five) blocks and build a staircase.

Example:



2. Build a number pyramid from this staircase by placing blocks „underneath“ it.

3. What do you have to consider? Write down your observations.



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# 16

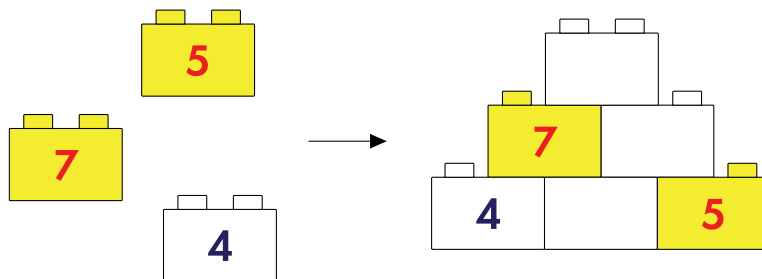
## Researcher task: Completing number pyramids

Pair work

1. Choose three blocks smaller than 10 and write down the numbers.

2. Everyone builds these blocks into a pyramid of 3 (pyramid of 4). Draw the number pyramid.

Example:



3. Place each of the three selected building blocks in a different place in the number pyramid and rebuild it.

Draw all the possibilities.

4. What changes as a result of moving the building blocks? Write down your observations.



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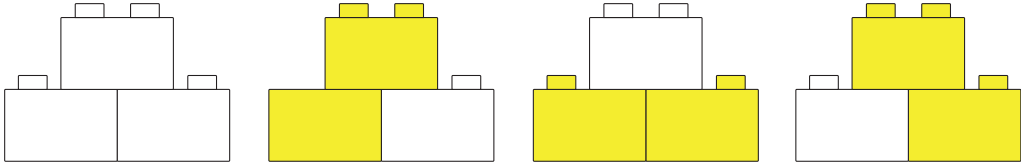
# 17

## Researcher task: All possible patterns


Pair or group work

1. Find all possible patterns of yellow and white blocks for pyramids of 2 (pyramids of 3, pyramids of 4, etc.).

Examples for pyramids of 2:



- 2. Draw all the possibilities.
- 3. Did you also build the same patterns from different numbers? How can this be? Write down.



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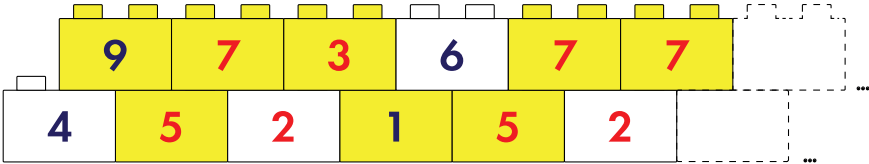
# 18

## Researcher task: Number walls

Individual or pair work

1. Build a number wall of two (two blocks high) or optionally a number wall of 3 (three blocks high).

Example:



- 2. Use all the blocks.
- 3. Draw the number wall.
- 4. How many blocks does your number wall consist of?

My number wall consists of  blocks.

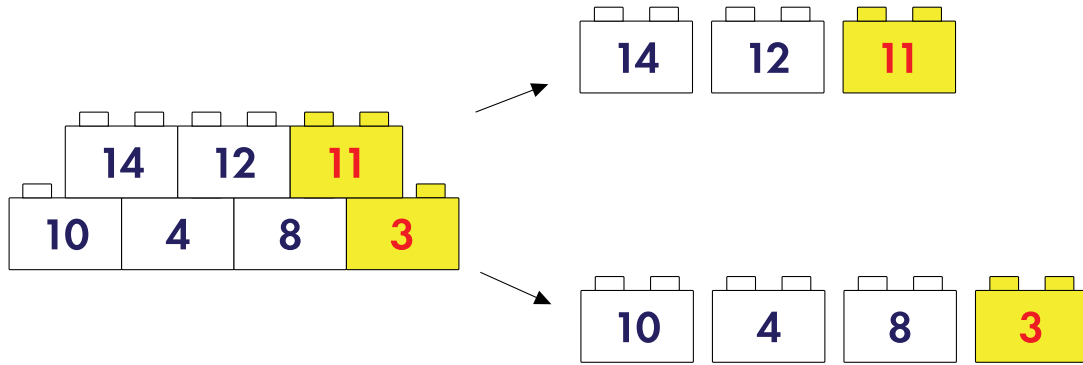
# 19

## Researcher task: Domino blocks

Pair work

1. Build a number wall of two with seven (nine, eleven, thirteen) blocks.
2. Take them apart again. Make sure that the top three (four, five, six) and the bottom four (five, six, seven) bricks do not mix.
3. Pass these blocks to your partner and have them build a number wall with the same blocks again.

Example:



4. Write down what you notice.



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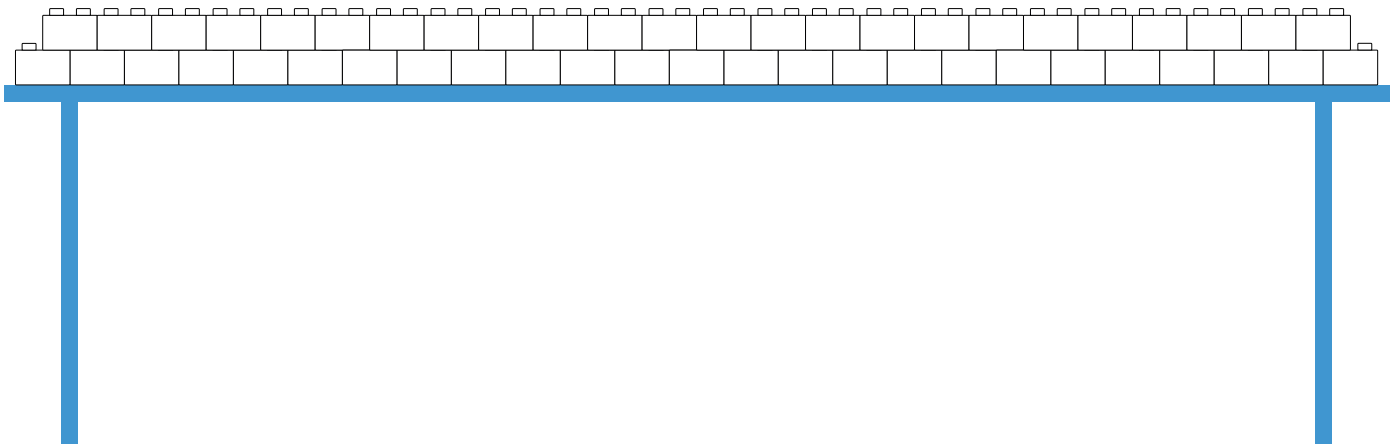
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# 20

## Researcher task: Fast building

Pair work

- Race to build a number wall of 2.  
Who will make it from one side of the table to the other first?



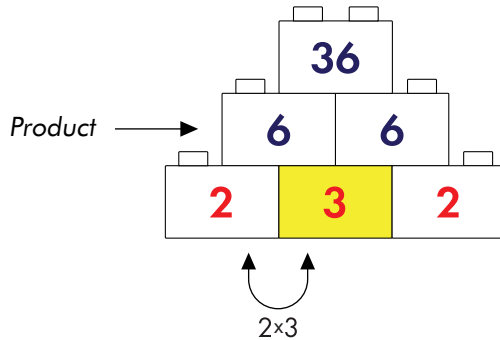
# 21

## Researcher task: Multiplication pyramids

Individual or pair work

1. Build a multiplication pyramid according to this rule:

**Example:**



The numbers on two blocks sitting next to each other are multiplied together. The number of the cap block sitting centrally on both is the product.

2. Build more multiplication pyramids.
3. Investigate: When do red numbers occur? Write down.
4. Find a new rules for building number pyramids. What are the rules? What is special about them? Write it down.

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# 22

## Researcher task: Number rectangles

Individual or pair work

1. Build a tower with ascending numbers.
2. Try to divide the tower into equal parts so that they form a rectangle when placed next to each other. Is that always possible?
3. Build other towers and do the same.
4. What happens if the top number is red? Write down.



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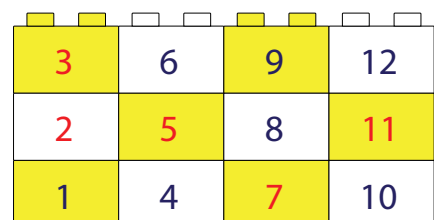
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**Example:**



# Researcher task: Inventing games

Individual, pair or group work

1. Think of other games with the blocks. Think of other shapes like stairs, towers, windows, etc.
2. Write instructions for your game and demonstrate it to your classmates.

**Example:**

