Content of today's lecture

1.
What did we tell in the lecture on Realistic Mathematics Education?

2.
History and context of the Big Mathematics Day (BMD)

3.
The structure of a Big Mathematics Day

4.
Examples of activities

5.
Teacher skills for the BMD

6.
Connections with the standard curriculum

We are very happy to make this connection between Netherlands and China!

‘Grote Rekendag’

Big Mathematics Day

And we got questions

about the Big Mathematics Day

from different Chinese places!

from last lecture! (September 30)

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Big Mathematics Day

Section 1

What did we tell in the lecture on Realistic Mathematics Education?

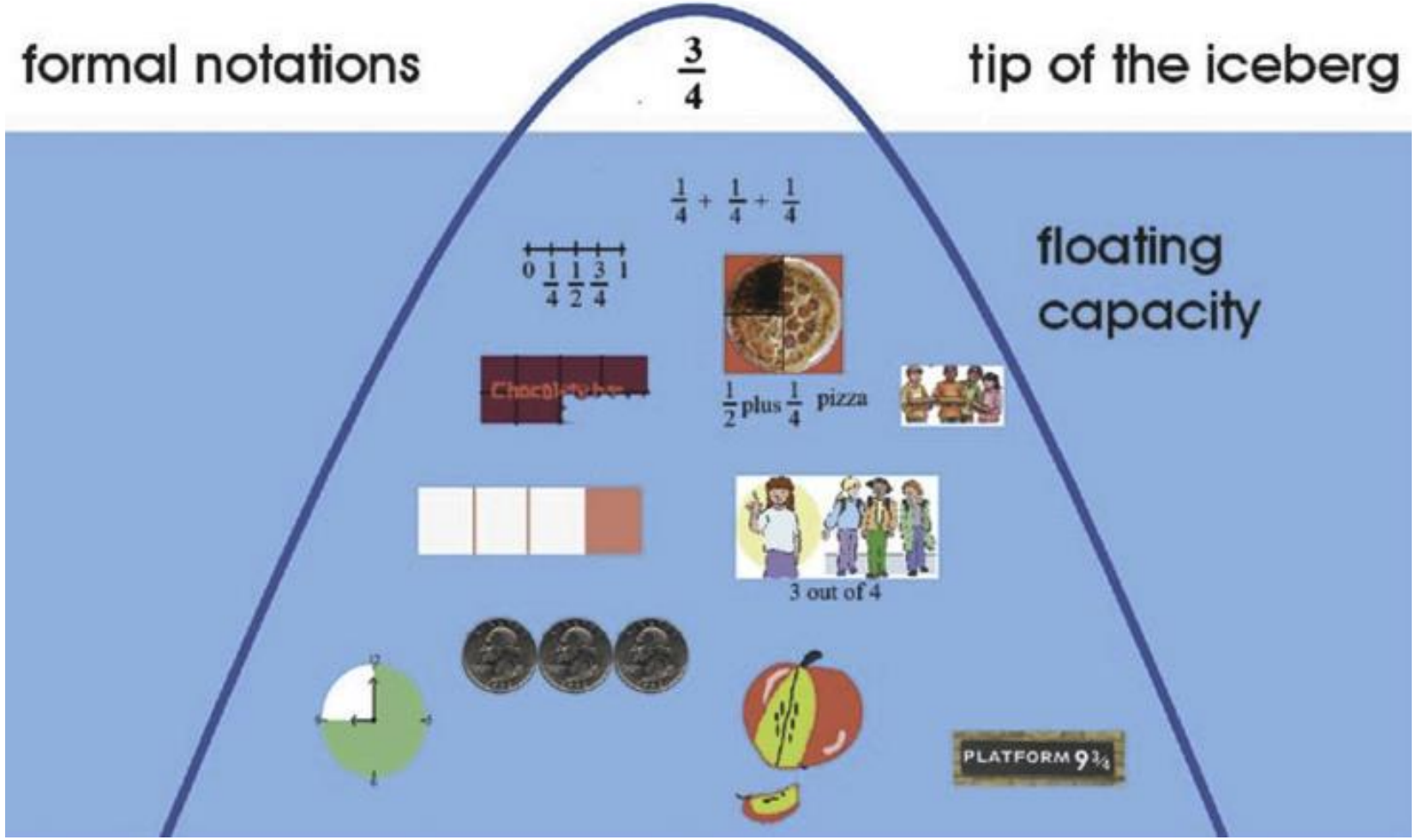
September 30 (Michiel Veldhuis)

We asked participants of the Lecture (Michiel Veldhuis) on September 30:

Which aspects of the Lecture did you find most thought-provoking? [multiple responses]

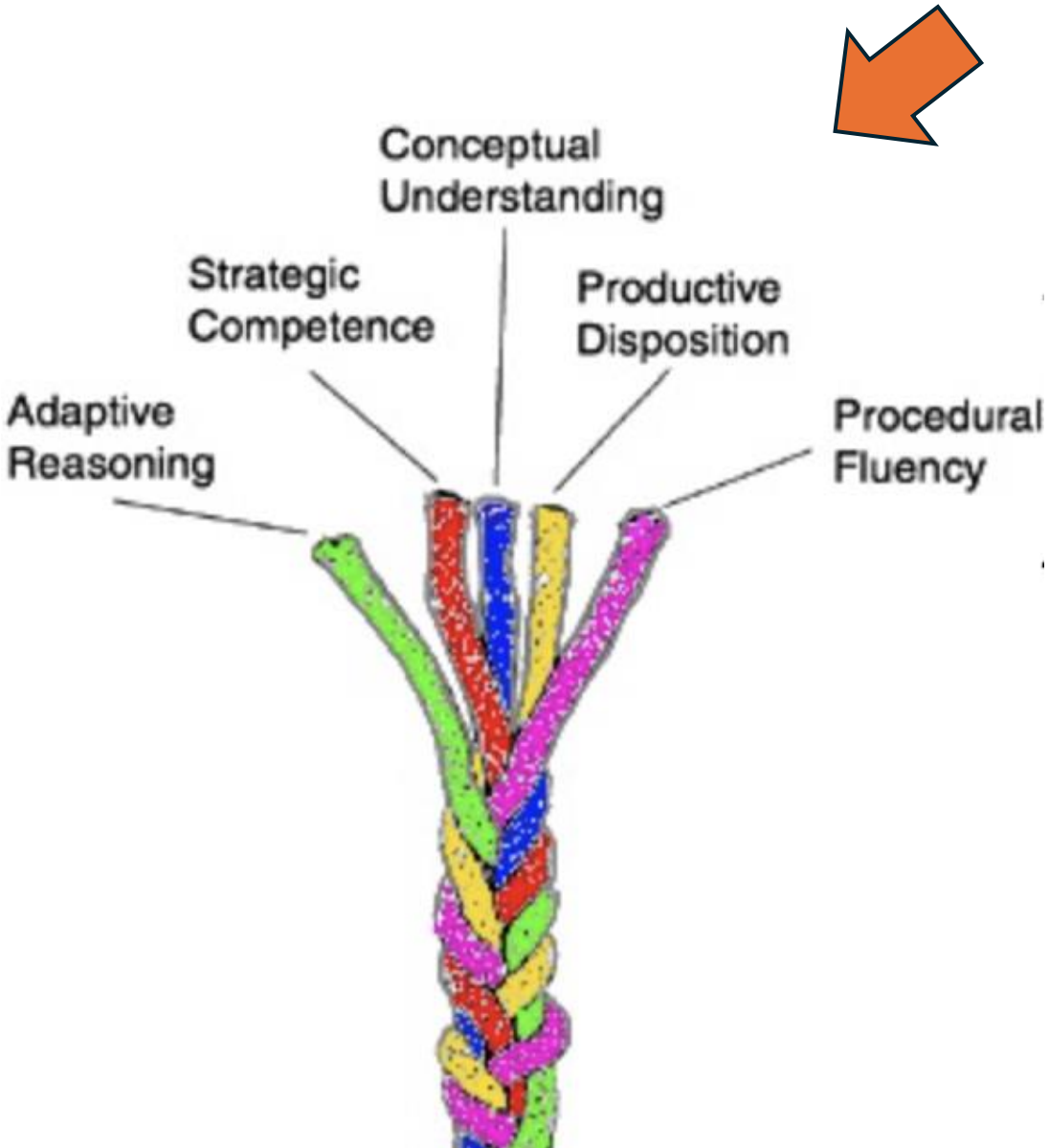
Response option	Count
A. The history and core principles of RME	1
B. The use of models in students' mathematics learning	16
C. Situated cognition, embodied cognition, and inquiry-based learning	5
D. Historical connections between RME and mathematics education in China	1
E. Current implementation of RME in Dutch primary schools	3
F. Examples from Dutch primary school mathematics textbooks	6
G. Examples of classroom teaching in Dutch primary schools	4
Number of respondents to this question	19

Models used for mathematics education



Iceberg model

Intertwinement Model



You need practice, but you also need to learn how to apply what you've learned

Jeremy Kilpatrick

Kilpatrick, J. (2001). Understanding mathematical literacy: The contribution of research. Educational Studies in Mathematics, 47(1), 101-116. doi:10.1023/A:1017973827514

Those models, coming from the didactics
of Realistic Mathematics Education (RME),
and work on ‘mathematical literacy’ (‘numeracy’)
helped us building the Big Mathematics Day

Together (China and Netherlands) we have this long tradition on the principles of RME:

- Context is important (make learning meaningful)
- Learning and working in social context (learning together)
- Emphasize basic skills, but also work on higher-order skills (problem solving, modeling, etc.)

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Big Mathematics Day

Section 2

History and context of the Big Mathematics Day (BMD)

History and context of the Big Mathematics Day (BMD)

- How it started
  - Teachers are used to follow the textbook
  - We liked to add something to the Math lessons in order to bridge the gap between ’learning basic skills’ and ‘using those skills in new situations’
- In the Netherlands we have different textbook series for math in primary education -> What do we miss? And how do you organize this?
- We decided to organise one day a Year. And we started in 2003. In 2027 we celebrate the 25 anniversary!

We work together with a Dutch publisher MALMBERG

Themes used for the age group 3 – 12 years

- Some examples of the design process:
  - Do you design materials close to the textbook?
  - Do you use one narrative/story for all activities (3-12 years old)

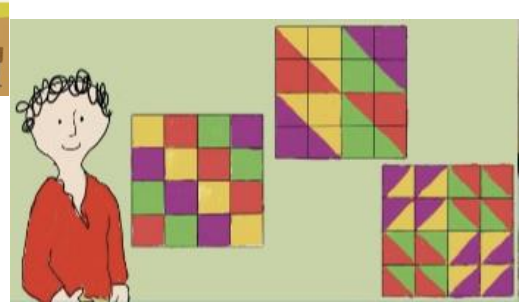
- What is the role of ‘collaboration’

- What is the role of ‘creating’/designing

2003 – a first pilot

2004 - geometry

2005 – collect, order, visualize



2006 – Playing with numbers
2007 – Geometry, patterns and art
2008 – It's about time
2009 – Money
2010 – Body measurement
2011 – Are you sure?
2012 – Animals and Math
2013 – Amusement Park
2014 – Classroom statistics
2015 – Mathematics (geometry) and art
2016 – Let's have a look behind the code
2017 – Measuring, moving and constructing
2018 – The school as a warehouse
2019 – Out of proportion
2020 – The number factory
2021 – On a mathematical journey
2022 – The architect makes the construction
2023 – The Waste Parade
2024 – Capturing Data
2025 – Fair Share

Mathematics Education also has a close relation with the broader STEM area

S cience

T echnology

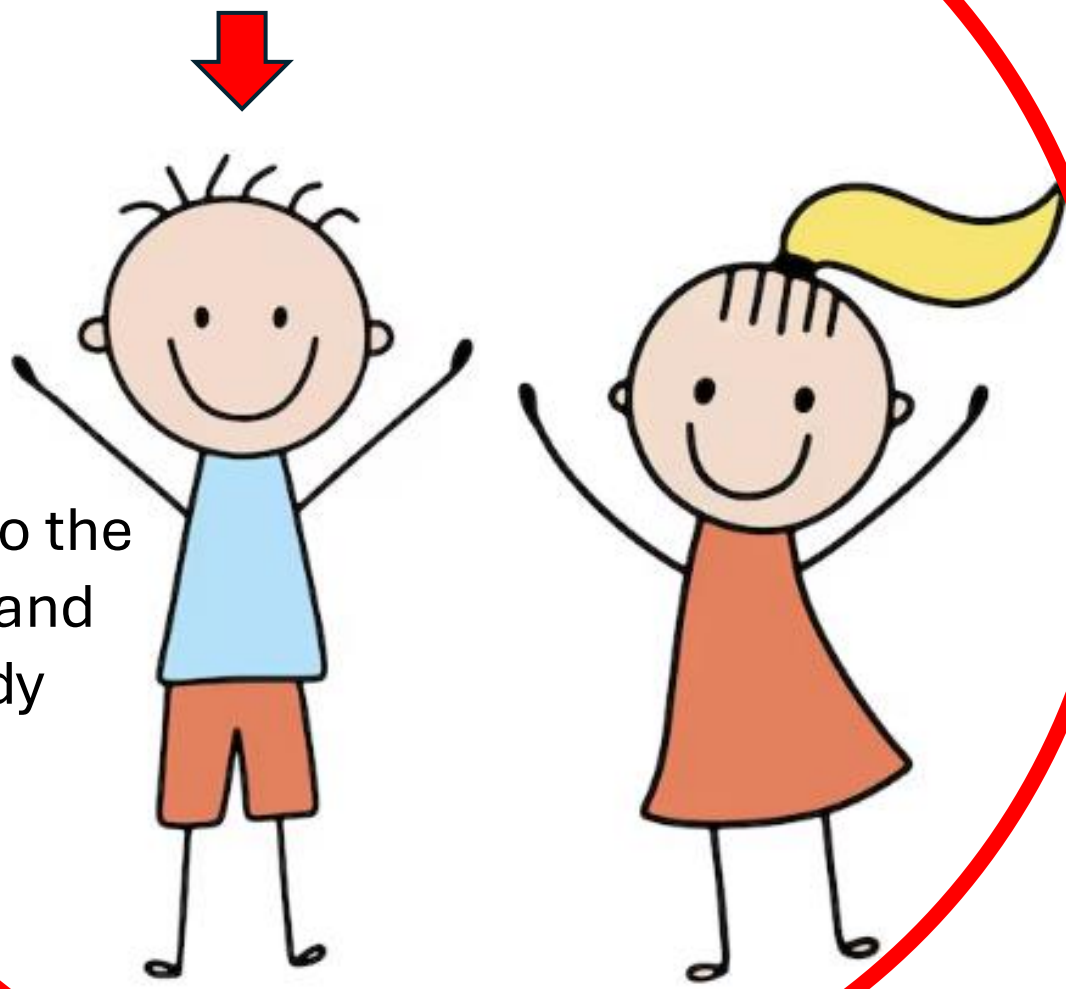
E ngineering

M athematics

And working together

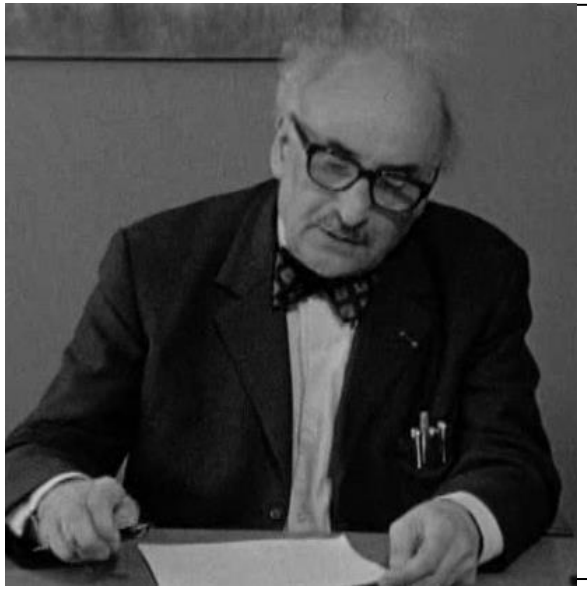
Not only using the head

But also the hands and the body



Like Freudenthal said: “mathematics as a human activity”

Mathematics as a human activity



"What humans have to learn is not mathematics as a closed system, but rather as an activity,
the process of **mathematizing reality**
and if possible even that of
mathematizing mathematics."
(Freudenthal, 1968)

Beginning with abstractions and definitions to be applied later

Beginning with **rich contexts** that ask for **mathematizing**

In march 2026 there was a first pilot in China

2026 – Could this be correct?

The joy of an international day of mathematics

And we are working on the 2027 version!

March 2027

Maybe with a connection to the PI Day (March 14)
(PI - 3.14 ...)

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Big Mathematics Day

Section 3

The structure of a Big Mathematics Day

The structure of a Big Mathematics Day

- Start with the whole school (preferrably outside in the school yard)

- In the classroom a first introduction by the group teacher (introducing the Theme)

- A startup activity
- Then working in groups with ‘closed’ tasks
- Next step: more open

Average time schedule for the Big Mathematics Day

Time	Duration	Activity
08:15	30	Opening with the whole school
08:45	15	Teacher gives introduction
09:00	60	Working in groups
10:00	20	Short break
10:20	30	Quiz
10:40	70	Work in a more open situation (in groups)
11:50	15	Presentation/Closure

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Big Mathematics Day

Section 4

Examples of activities

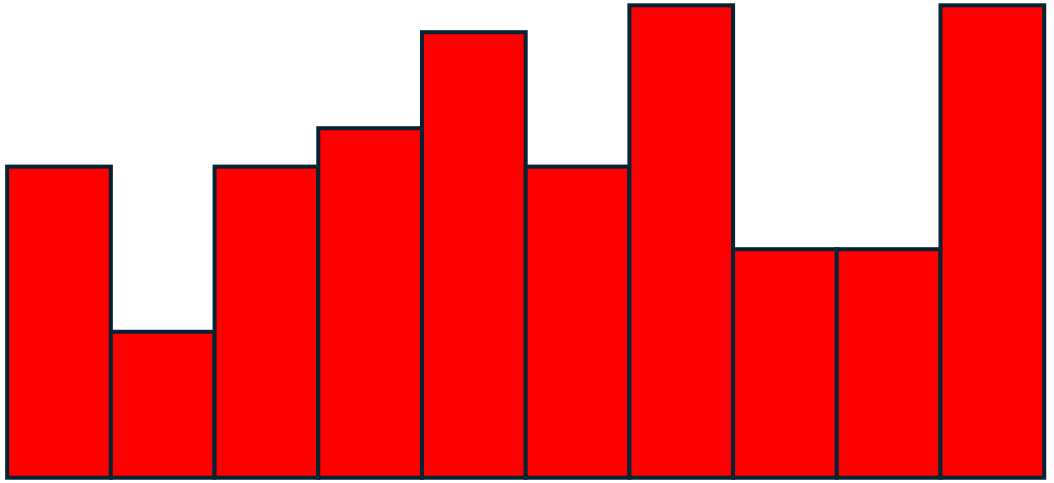
After attending the lecture, how well do you understand the core principles of RME and their classroom application?

Response option	Count
A. I have a fairly clear understanding and can envisage specific teaching approaches	0
B. I understand the main principles but need more classroom examples	**12**
C. I have an initial understanding, but some aspects remain unclear	7
D. I still find it difficult to understand or judge	0
E. I watched only part of the lecture and cannot judge at this stage	0
Number of respondents to this question	19

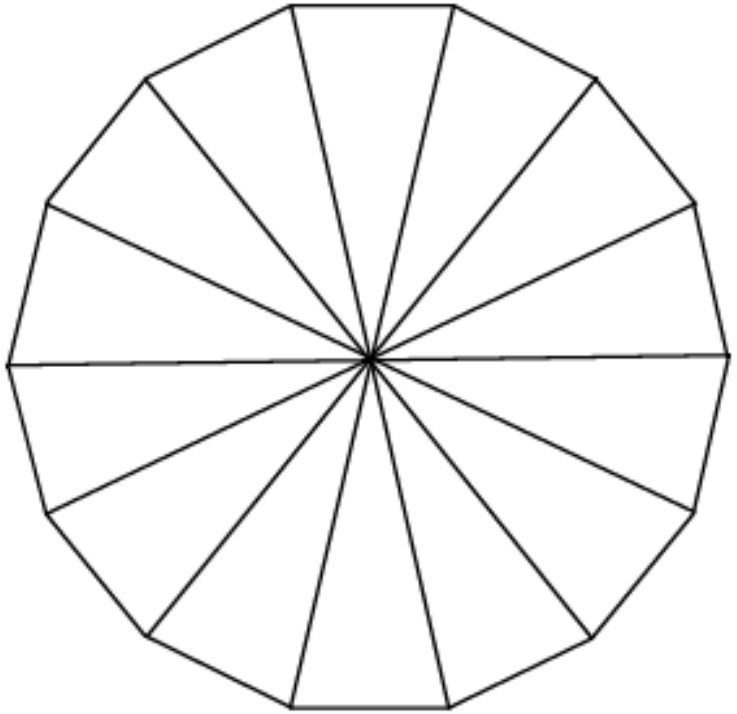
Examples of activities from different Big Mathematics Days:

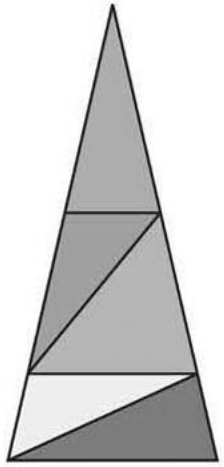
- For the whole school
- Individual activities
- Group-work
- Etc.

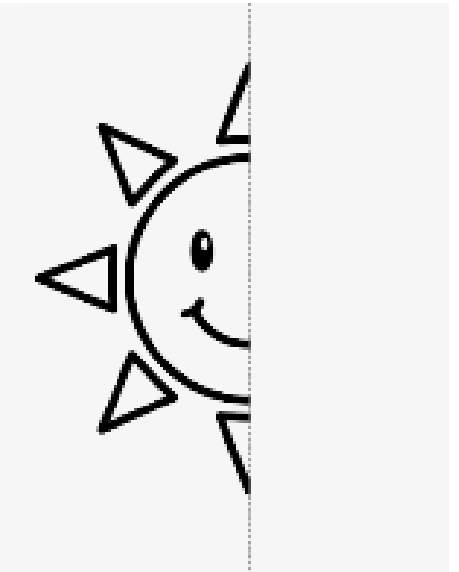
A living graph!



Using a mirror to explore symmetries







How much sand is there in the sandbox?

How do you go about this? What are you going to measure at the sandbox?

Your height is greater than your arm span.

True or false?

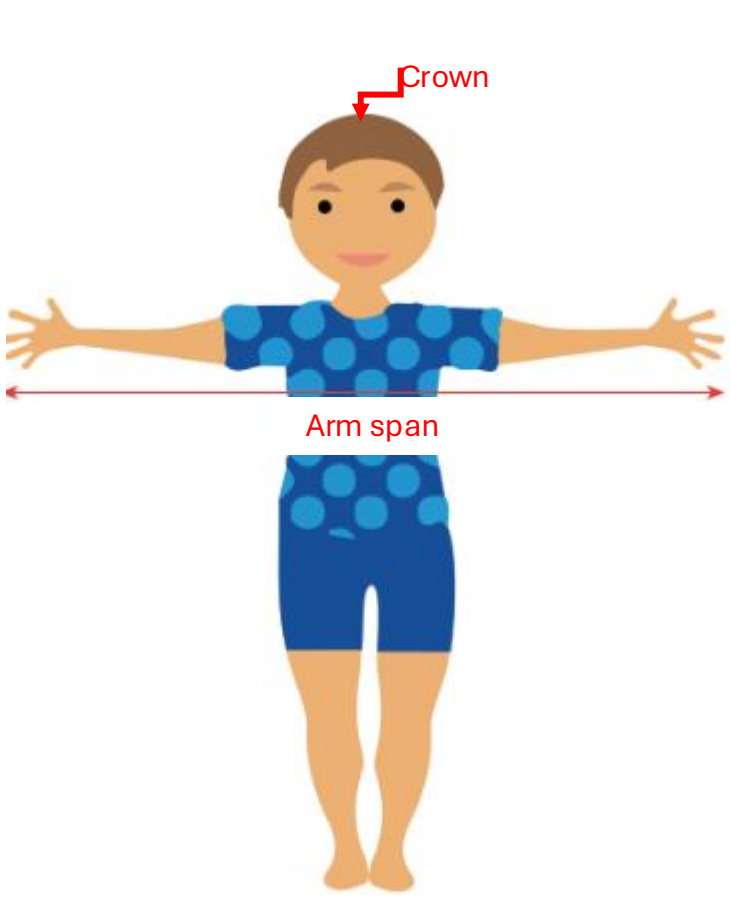
Measure with a string

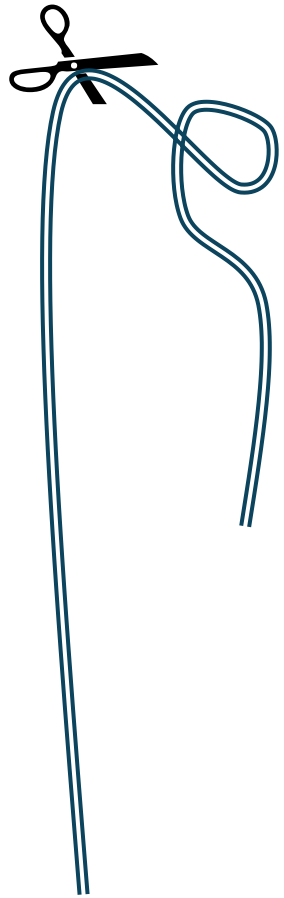
Measuring Your Body.

Arm span: the length of your arms when stretched out horizontally, from the tip of your left finger to the tip of your right finger.

Have students measure using a string.

Measure the height, and then check together whether it is greater than, less than, or equal to the arm span.

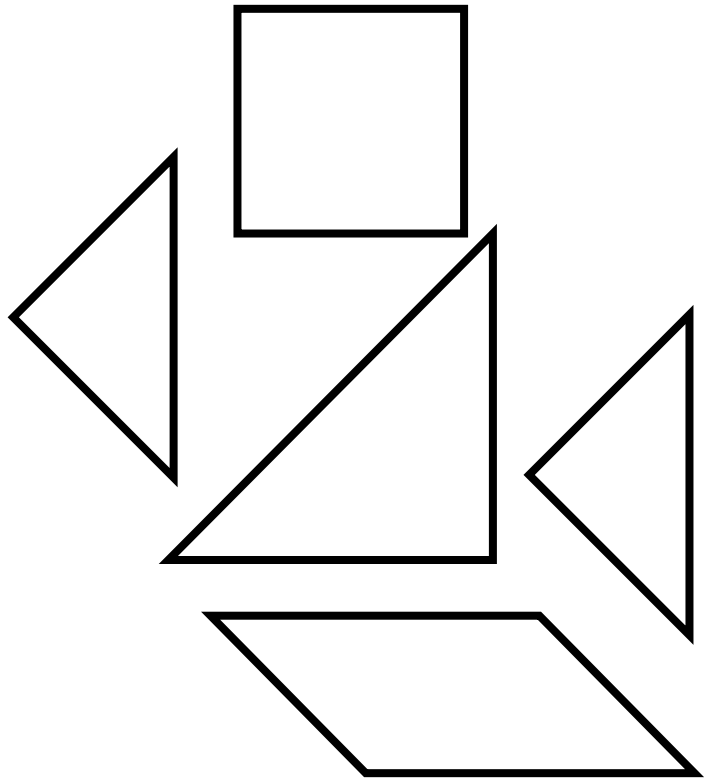


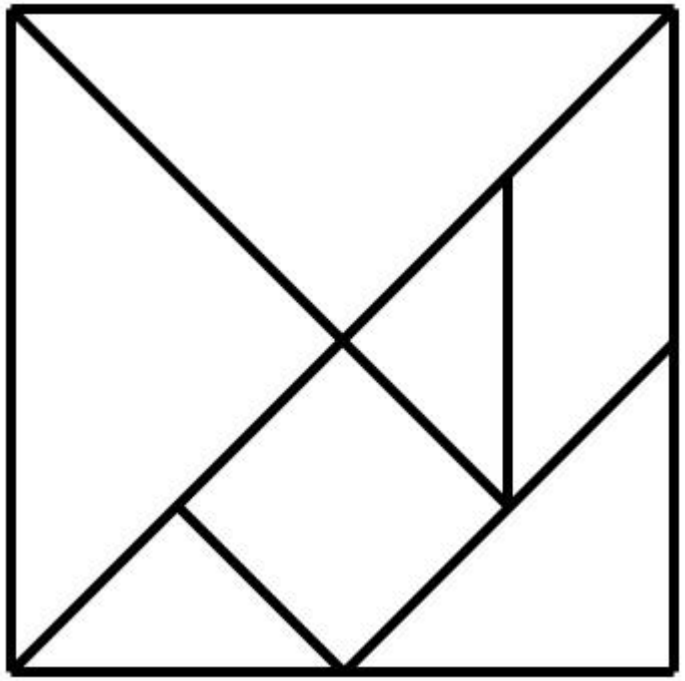


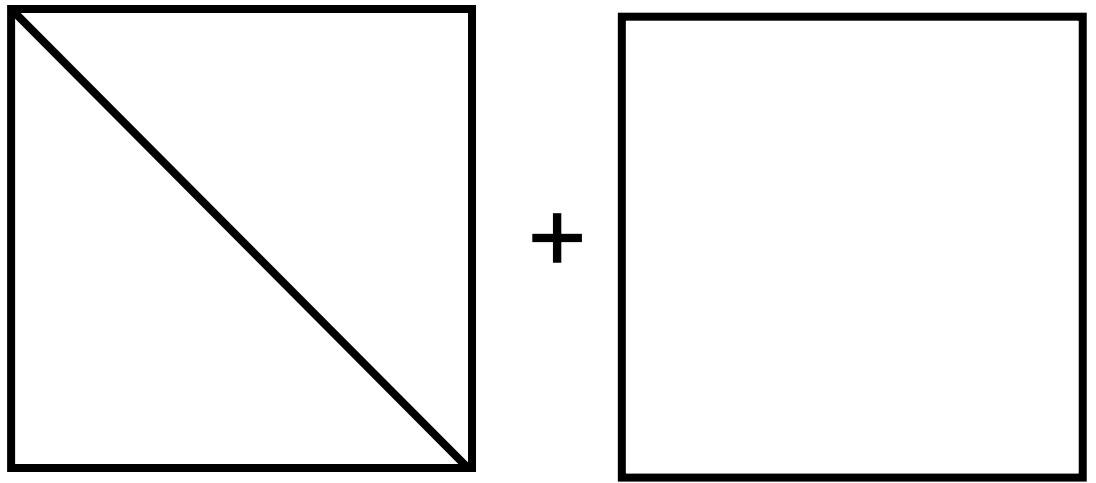
True or false?

You can make two squares of equal size using all the tangram pieces.

Tangram: Puzzling with the tangram pieces

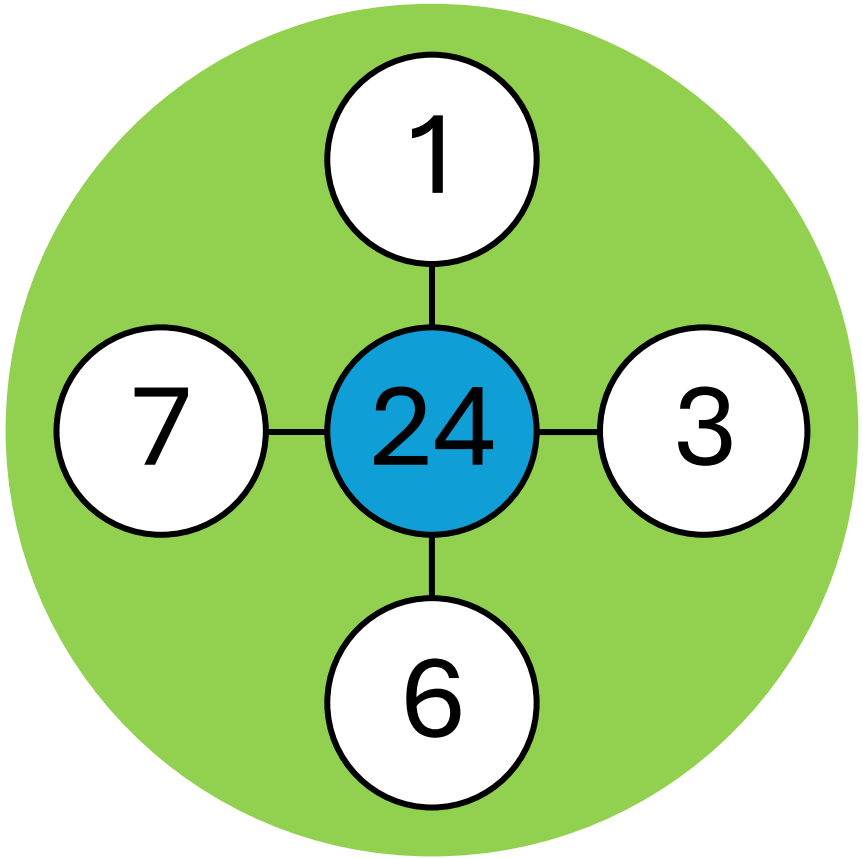






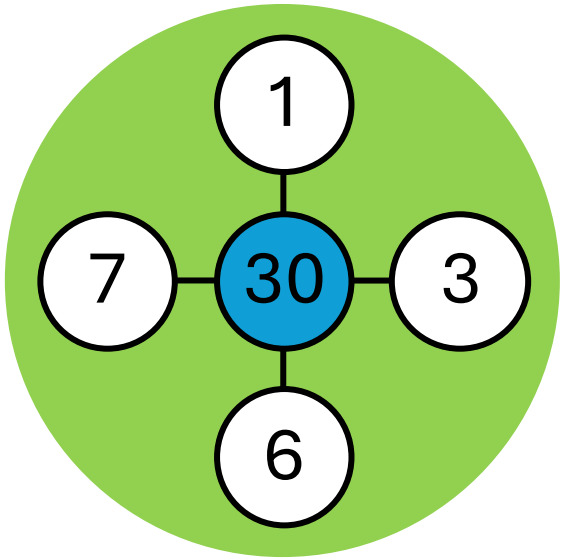
True or false?

Using the numbers 3, 7, 1, and 6, you can make an equation that equals 24.



The 24 Game. You may add, subtract, multiply, and divide. You use all the numbers.

Bonus question: You can also use these numbers to make the number 30.



Now some examples from BMD 2027

We are currently in the process of finalizing those activities

in order to put them on the website.

Twenty-five.
A festive number!

Activities for the age group 3-12 years old

Big Mathematics Day 2027

Activities for the age group 3-5 years old

Traveling on Bus 25

- Activity 1 - Paint the number 25
- Activity 2 - 25 rolls
- Activity 3 - Hand painting
- Activity 4 - Stringing a beaded necklace
- Activity 5 - Coloring a coloring page
- Activity 6 – Building a route for line 25

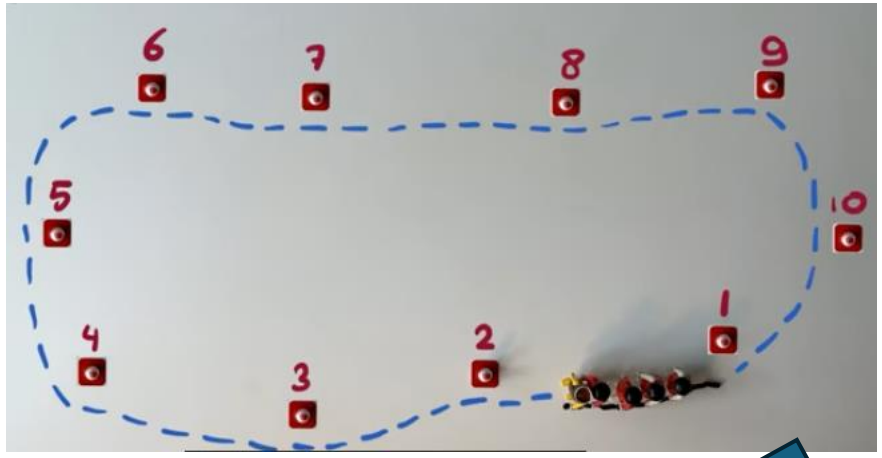
The baker also travels with the bus!

Structuring in groups of five

- You can use clay
- You can use tokes

You work in groups!
(about 5 to 6 students per group

Activities for the age group 6-8 years old



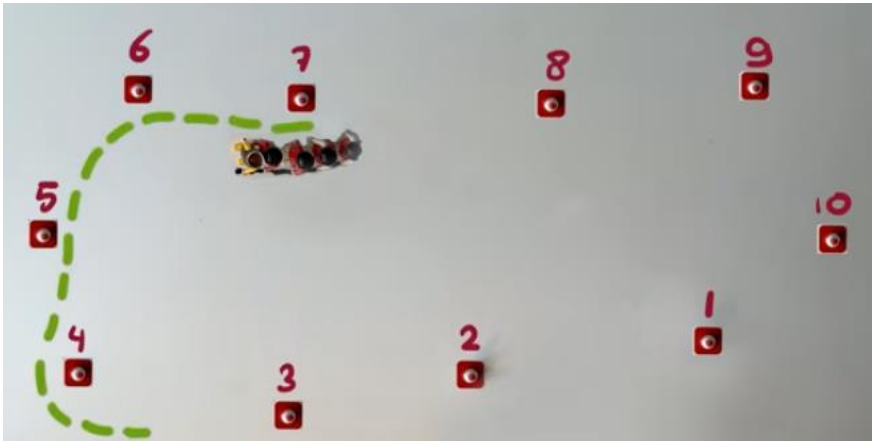
A game to be played outside

Every passenger gets a route with several stops

The students will travel in buses of 4 passengers each (and a driver)

There are 10 bus stops

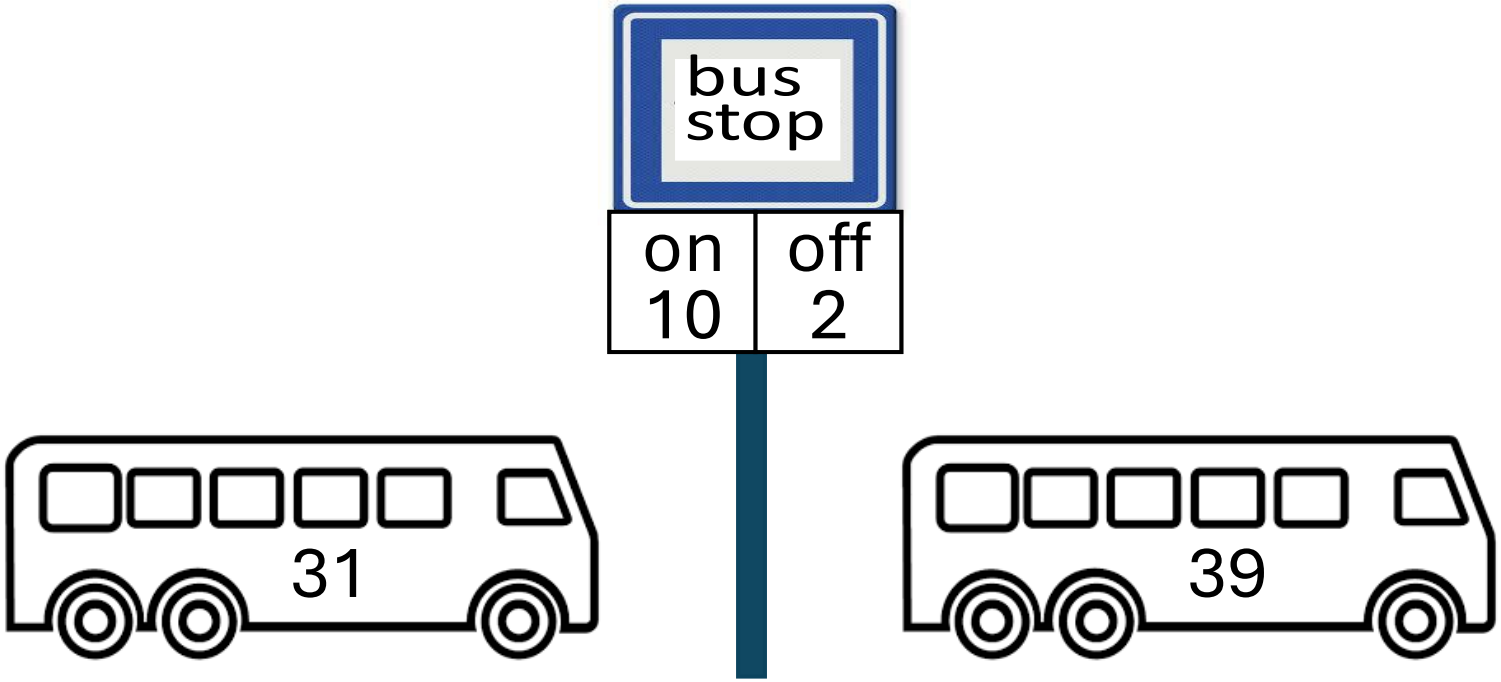
And there is also a bus that goes Counter-clockwise



They hold a rope to make the bus

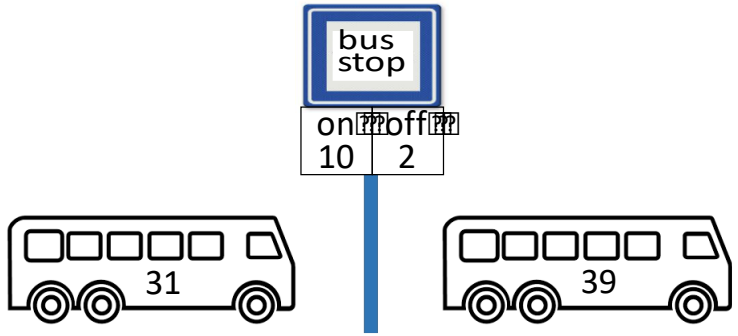
Models as bridges to a more formal level

Context → Model

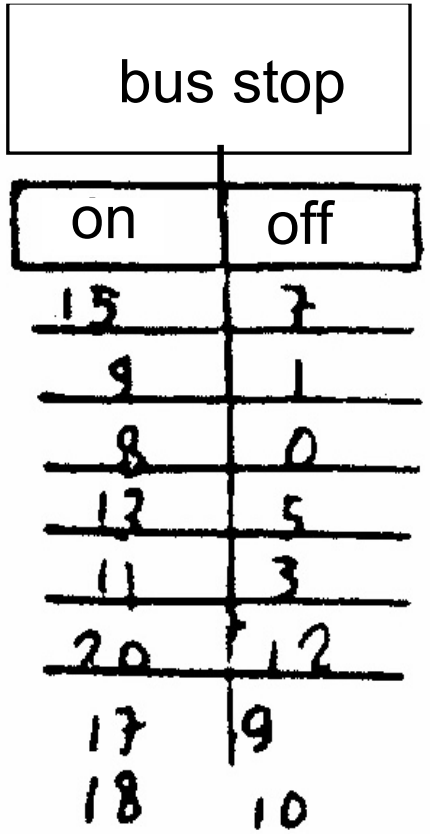


Models as bridges to a more formal level

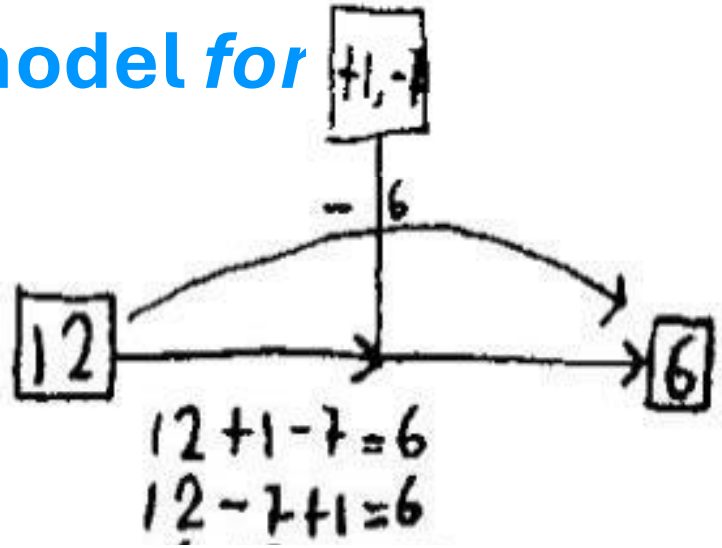
Context → Model



model *of*



model *for*



Make sums that add up to 25

Can you do that:

- with 3 dice?
- with 4 dice?
- with all the dice (6)?

Activities for
the age group
9-10 years old

Make sums that add up to 25

Example with 3 dice

5 x **5** = 25 en 25 x **1** = 25

Example with 4 dice

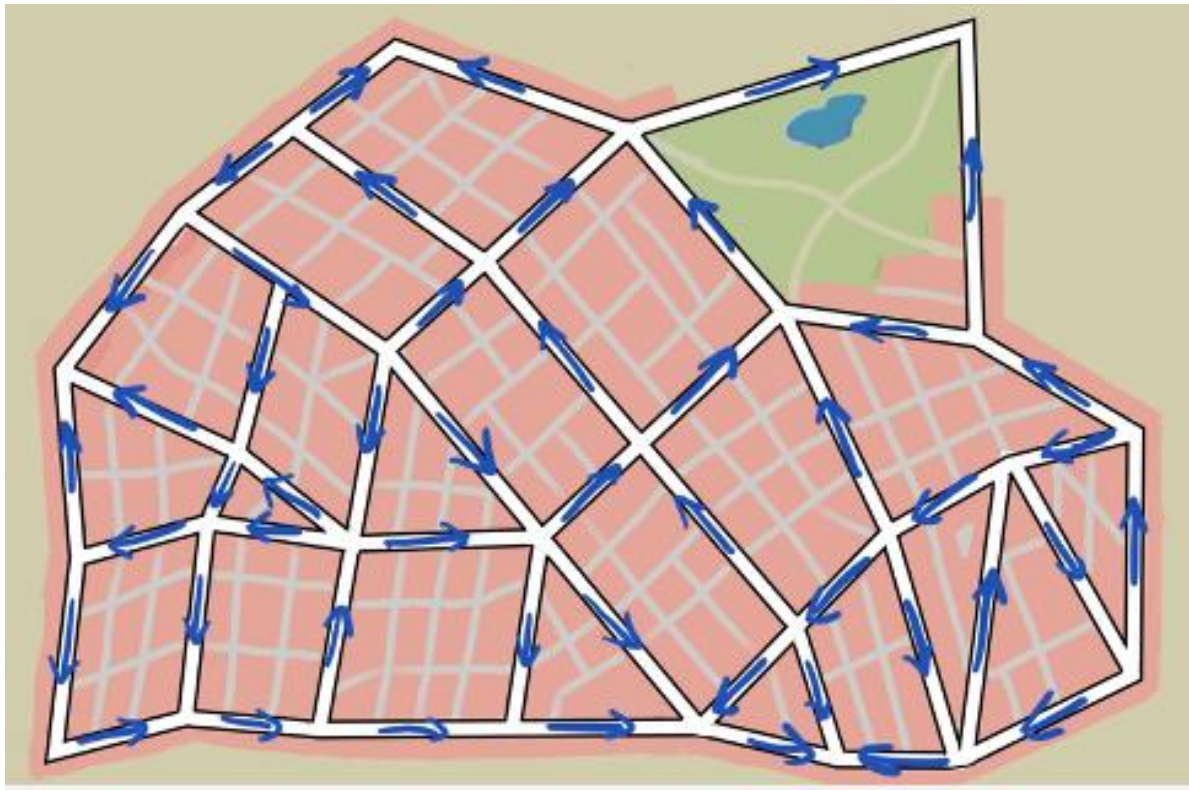
5 x **5** = 25

en 25 + **3** – **3** = 25

Example with 6 dice

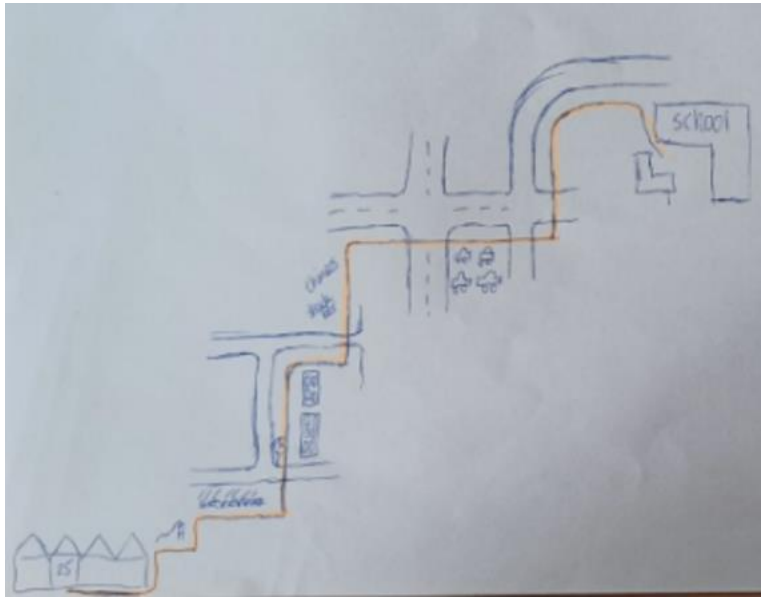
3 – **1** = 2 en 2 x **6** = 12

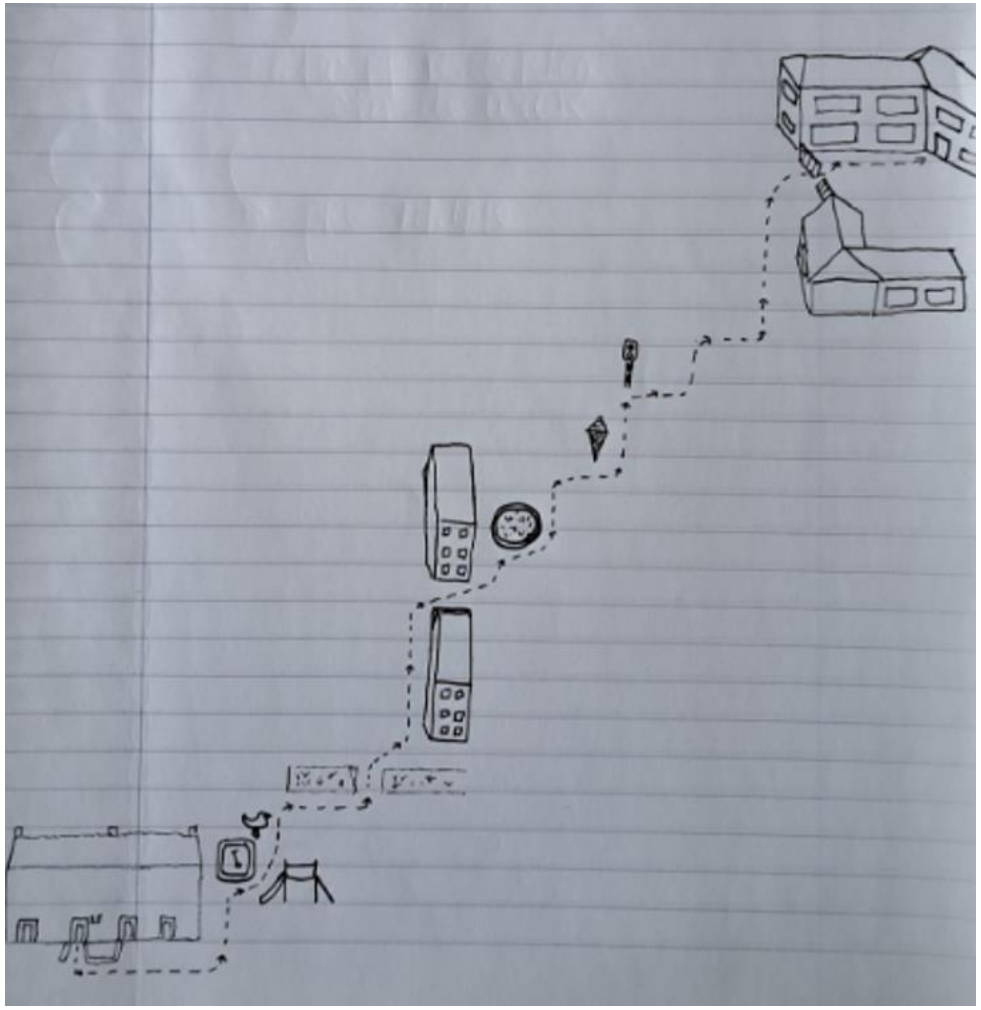
En 12 + **5** + **5** + **3** = 25



Activities for the age group 11-12 years old

Make a drawing of the route you use from home to school





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Section 5

Teacher skills for the Big Mathematics Day

Question: After the lecture of Sep. 30, would you be willing to try applying RME principles in your teaching or teaching and research work

Response option	Count
A. Yes, and I already have fairly specific ideas	3
B. Yes, but I need examples or guidance	**12**
C. I am currently unsure and need to learn more	4
Number of respondents to this question	19

Question: What difficulties might you encounter when applying RME principles in teaching?

Response option	Count
A. Uncertainty about how to translate the principles into specific lesson designs	7
B. A lack of suitable textbook examples or teaching resources	9
C. Large class sizes make it difficult to organise student inquiry and discussion	**11**
D. Limited lesson time or constraints on teaching pace	8
E. Substantial differences in students' prior experience or learning foundations	5
G. No obvious difficulties at present	1
Number of respondents to this question	19

Teacher skills for the Big Mathematics Day

- Supporting group work
- Be curious towards all children. Ensure a positive/collaborative atmosphere
- Working with open questions. Formal Assessment
- On the BMD you have no textbook…

Supporting group work

- Classes in NL are about 25
- Classes in CN are about 50

The students will understand that you have a different role!

Be curious towards all children

Ensure a positive/collaborative atmosphere

- You know in a group with 60 children you have a lot of differences
- Be aware that your positive feedback is very important!
- So praise the good
- But also give credit to the childeren who took longer to finish
- Especially on the BMD: it is not about speed / 0 mistakes: it is about working together!

Working with open questions

Formal Assessment

Those are two principles that can enrich the classroom setting, and we use them both within the BMD:

- Maybe you don’t like the situation that you, as a teacher, do not know the answer. -> Students are not suprised!

- The BMD changes the focus from the outcome to the process.

They will understand that you have a different role!

On the BMD you have no textbook…

- What is the main role of textbooks in your everyday teaching?
  - The main basis for teaching; I follow the book (11)
  - An important basis for teaching; I adapt or reorganise (4)

- How much do you rely on textbooks when designing lessons?
  - High (11)
  - Moderate (3)

- When we organise BMD activities we describe ‘degrees of freedom’

For the preparation of the BMD you need an organizer in your school

- In the Netherlands many primary schools do have a ‘coordinator’ for mathematics education
- This is one of the teachers of the school.
- This teacher followed extra workshops, etc. to become the ‘coordinator’
- This coordinator also plays an important role in the preparation of the BMD

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Section 6

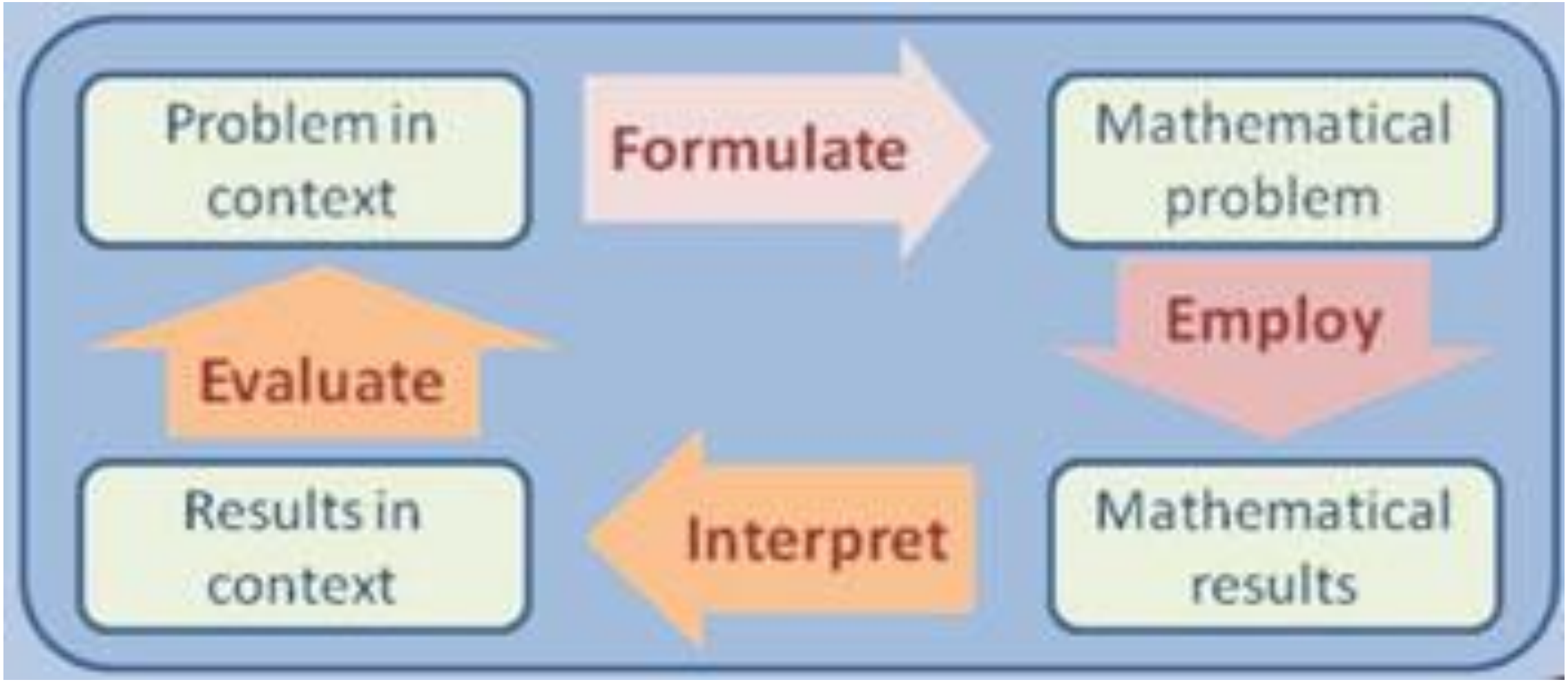
Connections with and implications for the standard mathematics curriculum

5 minutes

Connections with and implications for the standard mathematics curriculum

- The Big Mathematics Day is only one day a year
- What is the connection with the standard mathematics curriculum?
- Is it possible to use activities of the BMD throughout the year?

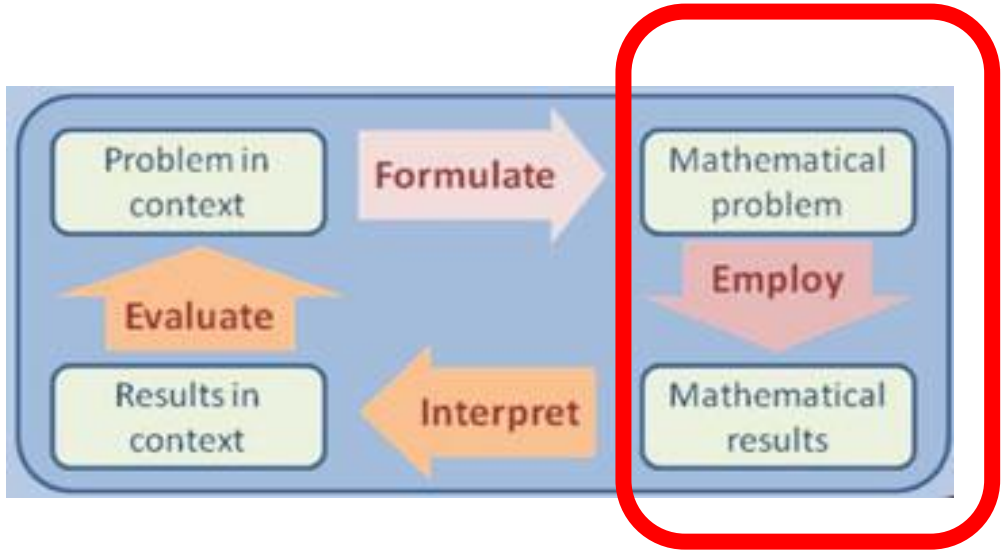
Again: we need something with mathematics education that expands the functional use of it

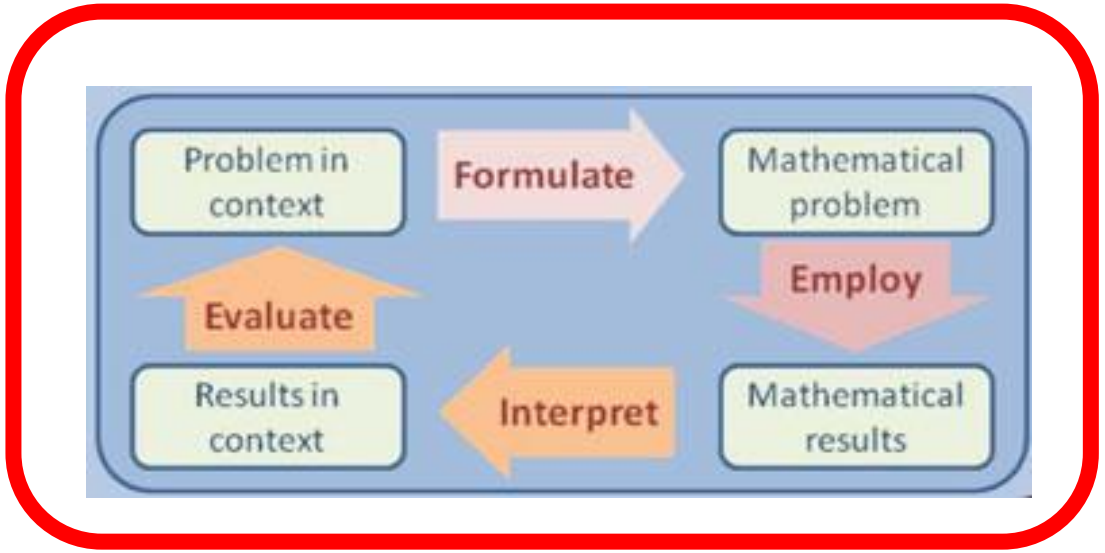


Source: Pisa, etc.

Mathematics education with a strong focus on procedures

Mathematics education with both emphasis on ‘basic skills’ and ‘use your knowledge in life situations’





Numeracy (PISA)

Thank you. Questions

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