



What can we learn from International Large-Scale Assessments?

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What can we (not) learn from ILSA's?

Part I: Casus TIMSS 2023 in Flanders

design, sample, content, results

Part II: What can we (not) learn from ILSAs?

possibilities and limitations

stakeholders use (teachers, schools, local & school government,
educational administration, researchers)

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TIMSS 2023

Design

- Performance **Mathematics and Sciences**
- Sample **Grade 4**
- International **58 educational systems**
- Trends **4 year cycle**

Population	CYCLI							
	1995	1999	2003	2007	2011	2015	2019	2023
Primary education – Grade 4			X		X	X	X	X
Secondary education – Grade 8	X	X	X					

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TIMSS2023: Flemish sample

Grade 4

Representative sample, based on

- educational network
- province
- socio-economic profile

International	Flanders (main study)	Flanders (bridge study)
58 countries 12.016 schools 359.098 pupils	146 schools 4336 pupils	43 schools 1136 pupils

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Performance Mathematics and Sciences

14 test booklets

- combination of all test booklets
- estimation of performance level
- assessment at system level

TIMSS measurement scale

- from 0 to 1000
- 500 = TIMSS anchor point
- Monitor comparability over time!

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Context data

Questionnaires

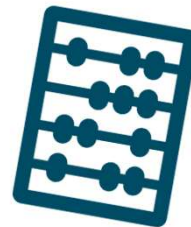
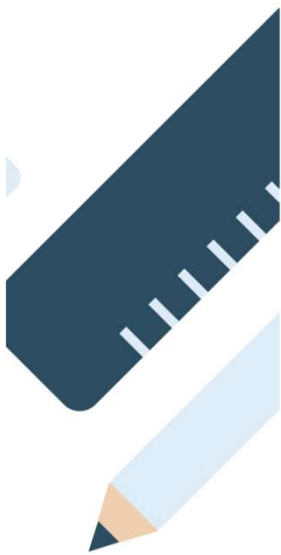
- students
- parents
- teachers
- principals

Aim: To gain insight into the relationship between performance level and contextual variables

E.g.: enjoying learning mathematics, preschool literacy, educational practices such as the use of computers, or the emphasis on academic success

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Mathematics: content and cognitive domains



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Mathematics

▪ Content domains

- Numbers (50%)
 - Integers (25%)
 - Simple equations (15%)
 - Fractions and decimals (10%)

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Mathematics - Numbers

Example:

The students are asked to fill in a value to make the equation correct

→ Requires knowledge and understanding of operations + insight into simple equations

Make the number sentences true.

Drag one number card to each box.

3	5	7	8
---	---	---	---

5 + is greater than 12.

20 - is greater than 15.

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Mathematics

- **Content domains**
 - Numbers (50%)
 - Integers (25%)
 - Simple equations (15%)
 - Fractions and decimals (10%)
 - **Measurement and geometry (30%)**
 - **Measurement (15%)**
 - **Geometry (15%)**

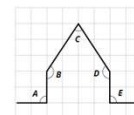
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Mathematics – Measurement and geometry

- **Measurement – 15%**
 - Measuring and comparing lengths and masses
 - Calculating areas and perimeters of simple polygons
 - Determining volumes using blocks (cubes)
- **Geometry – 15%**
 - Describing and drawing various geometric figures
 - Solving problems using geometric relationships
 - Recognizing properties of lines, angles, and planar and spatial figures

Example:

The students must correctly classify the different angles
 → Requires knowledge of correct terminology (right angle)
 and procedures to classify them



Identify the type of each angle in the diagram. Record your answers in the table.
 Angle A is already done for you.

	Right angle	Smaller than a right angle	Larger than a right angle
A	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
B	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
C	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
D	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
E	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

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Wiskunde

▪ Content domains

- Numbers (50%)
 - Integers (25%)
 - Simple equations (15%)
 - Fractions and decimals (10%)
- Measurement and geometry (30%)
 - Measurement (15%)
 - Geometry (15%)
- Data (20%)
 - Data visualization (10%)
 - Data interpretation (10%)

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Mathematics - Data

- Reading and presenting data (10%)
 - Reading various types of charts and tables
 - Completing or creating charts (such as bar charts, line charts, pie charts)
- Interpreting, combining, and comparing data (10%)
 - Interpreting data from multiple sources
 - Comparing datasets
 - Drawing conclusions based on numerical data

Example:

The students must complete the table based on the given information.

Students in a class made three different origami animals using blue, red, and yellow paper. The table shows the number of animals that were made with each color paper.

Animal	Color Paper		
	Blue	Red	Yellow
 Tortoise	8	4	3
 Giraffe	3	2	10
 Fish	10	6	

Complete the table by solving this puzzle:

- There are the same number of blue fish as yellow giraffes.
- There are the same number of red fish as the other two red animals combined.
- There are 24 yellow animals in all.

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Wiskunde

▪ Content domains

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 - Geometry (15%)
- Data (20%)
 - Data visualization (10%)
 - Data interpretation (10%)

▪ Cognitive domains

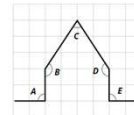
- Knowledge (40%)

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Mathematics – Knowledge

▪ Students demonstrate that they:

- Recognize and name facts, concepts, and procedures
- Can give examples of known subject matter
- Can correctly reproduce basic knowledge



Identify the type of each angle in the diagram. Record your answers in the table.
Angle A is already done for you.

	Right angle	Smaller than a right angle	Larger than a right angle
A	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
B	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
C	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
D	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
E	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

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Wiskunde

▪ Content domains

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- Measurement and geometry (30%)
 - Measurement (15%)
 - Geometry (15%)
- Data (20%)
 - Data visualization (10%)
 - Data interpretation (10%)

▪ Cognitive domains

- Knowledge (40%)
 - knowledge of concepts and facts, simple operations, and classifications
- **Application (40%)**

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Mathematics – Application

▪ Students use their knowledge to:

- Compare, explain, and interpret information
- Understand and apply models
- Solve practical problems

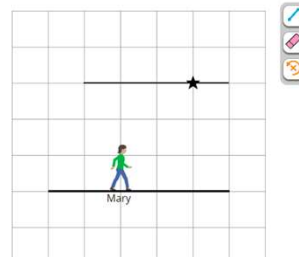
Example:

The students must know the concept of parallelism and also know how to apply it correctly.

Mary is walking along a path in the park.

There is another path in the park that is **parallel** to Mary's path and goes through the ★.

Draw the other path.



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Mathematics

▪ Content domains

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 - Measurement (15%)
 - Geometry (15%)
- Data (20%)
 - Data visualization (10%)
 - Data interpretation (10%)

▪ Cognitive domains

- Knowledge (40%)
 - knowledge of concepts and facts, simple operations, and classifications
- Application (40%)
 - using knowledge to solve problems and issues
- Reasoning (20%)

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Mathematics – Reasoning

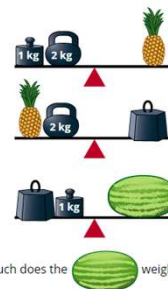
▪ Students are challenged to:

- Solve problems in new or complex situations
- Logically combine multiple steps
- Make connections and draw conclusions

Example:

The students must be able to apply their mathematical skills across different domains (operations, geometry) and over a number of steps to determine the weight of the melon.

On each scale the objects on the left weigh the same as the objects on the right.



How much does the  weigh?

- A 3 kg
- B 4 kg
- C 5 kg
- D 6 kg

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Mathematics

▪ Content domains

- Numbers (50%)
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 - Simple equations (15%)
 - Fractions and decimals (10%)
- Measurement and geometry (30%)
 - Measurement (15%)
 - Geometry (15%)
- Data (20%)
 - Data visualization (10%)
 - Data interpretation (10%)

▪ Cognitive domains

- Knowledge (40%)
 - knowledge of concepts and facts, simple operations, and classifications
- Application (40%)
 - using knowledge to solve problems and issues
- Reasoning (20%)
 - skills that go beyond what has been routinely practiced, explaining the thought process, problems that require several steps

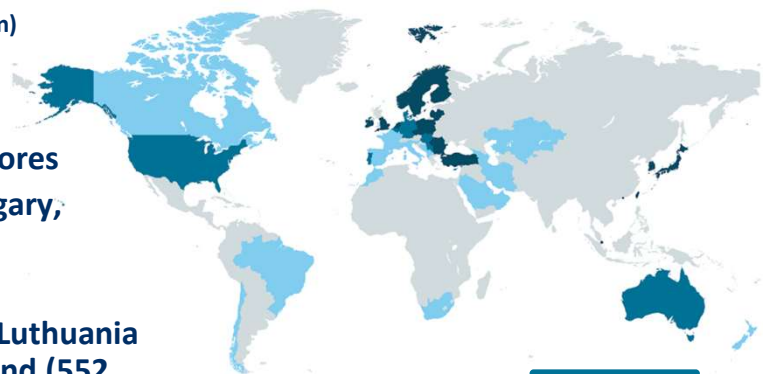
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International results mathematics

- Flanders 521 points (24th position)
- INT_AV 503 points

Belgium (FI) has comparable scores with Germany, Denmark, Hungary, Portugal, Cyprus, Slovakia

EU-best performing countries: Lithuania (561 points, 7th position), England (552 points, 9th position), Polen (546, 10th position)

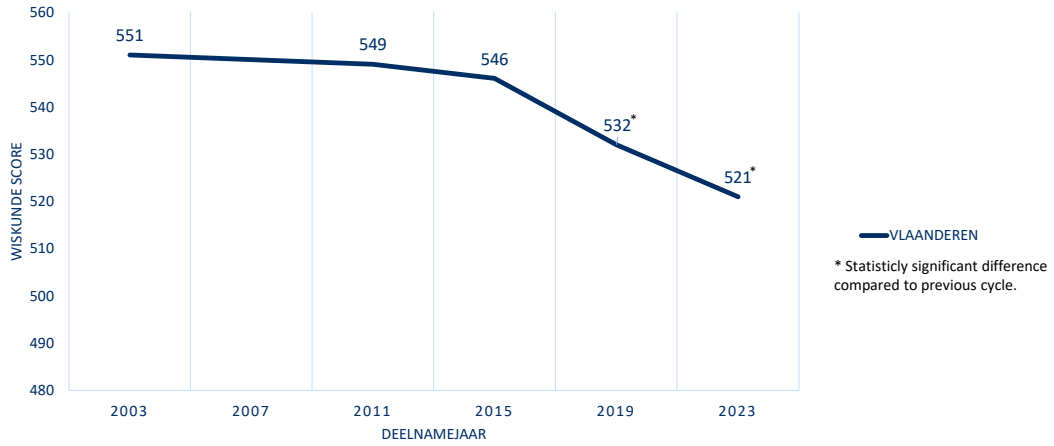


Legend: Countries score compared to Belgium (FI)

- Significant hoger
- Gelijkaardig
- Significant lager

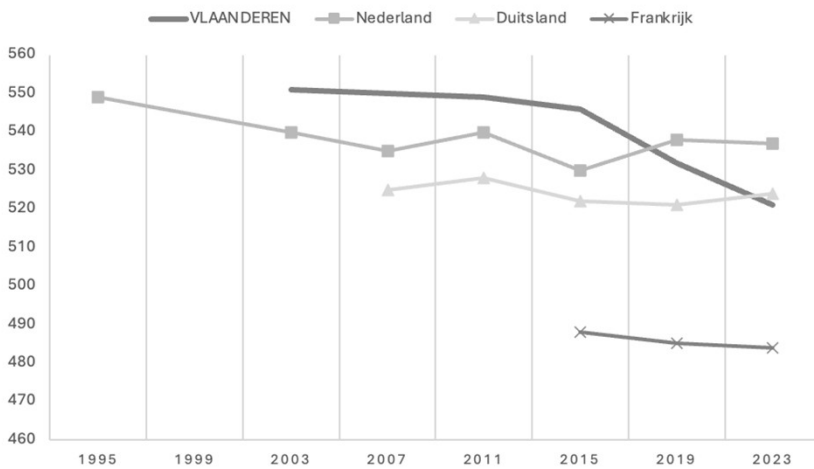
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Trend results mathematics in Flanders



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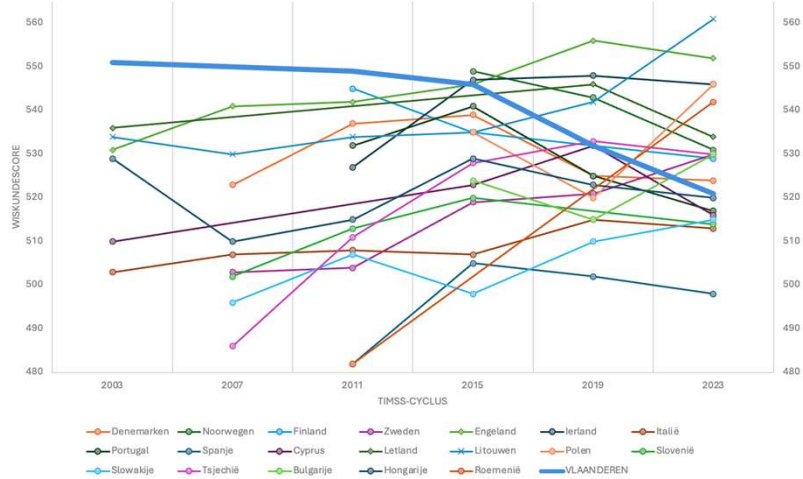
Trend results mathematics neighbouring countries



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Trend results mathematics in EES

- Flanders among sharpest decliners
- Most other countries are rising or stagnating
- Flanders sharpest decliner since 2015



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Content domains mathematics

- *Measurement and geometry* is the strongest domain within Flanders
- Significant decrease for *Measurement* and *Geometry & Numbers* (compared to 2019)
- Significant decrease for *all domains* compared to 2011

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Land	Algemeen prestatie-niveau-wiskunde (SE)	Getallen		Meten en Meetkunde		Gegevens	
		Gemiddelde domeinscore (SE)	Vershil algemene prestatie	Gemiddelde domeinscore (SE)	Vershil algemene prestatie	Gemiddelde domeinscore (SE)	Vershil algemene prestatie
Litouwen	561 (2,9)	562 (2,9)	1,2	556 (3,0)	-4,9*	567 (3,2)	6,3
Engeland	552 (2,7)	556 (2,9)	4,0	539 (3,2)	-13,0	561 (3,5)	9,2
Polen	546 (2,0)	541 (2,3)	-5,0*	557 (2,5)	10,7*	546 (2,4)	0,4
Ierland	546 (2,9)	548 (3,0)	2,2	540 (3,2)	-5,3*	546 (3,2)	0,3
Roemenië	542 (4,8)	552 (5,0)	9,7*	538 (5,2)	-3,9	519 (5,4)	-23,0*
Nederland	537 (2,0)	536 (2,2)	-0,7	534 (2,8)	-3,4	544 (2,4)	7,0*
Lëtland	534 (2,8)	533 (2,9)	-1,4	540 (3,1)	6,0*	532 (3,1)	-2,3
Noorwegen	531 (2,0)	530 (2,2)	-0,4	526 (2,6)	-5,0	537 (2,1)	6,3*
Tsjechië	530 (2,2)	534 (2,1)	3,5*	537 (2,0)	6,1*	512 (2,9)	-18,6*
Zweden	530 (2,8)	527 (2,6)	-2,9*	532 (2,8)	2,1	535 (3,0)	5,5*
Bulgarije	530 (3,6)	545 (3,3)	14,7*	527 (3,9)	-3,3	506 (4,8)	-24,1*
Finland	529 (2,5)	522 (2,6)	-6,9*	539 (2,7)	9,3*	536 (3,0)	7,0*
Duitsland	524 (2,1)	524 (2,5)	0,2	527 (2,3)	3,7*	520 (2,6)	-3,4*
Denemarken	524 (2,1)	516 (2,3)	-7,5*	530 (2,1)	5,9*	532 (2,3)	8,3*
VLAANDEREN	521 (2,4)	513 (2,3)	-7,6*	536 (3,0)	14,8*	524 (2,7)	2,8
Hongarije	520 (3,6)	527 (3,4)	7,2*	516 (3,7)	-4,1	504 (3,9)	-16,3*
Portugal	517 (2,8)	516 (2,8)	-1,4	510 (3,0)	-7,5*	528 (3,0)	10,4*
Cyprus	516 (2,5)	527 (2,3)	10,4*	508 (2,6)	-7,8*	501 (3,2)	-14,9*
Slovakije	515 (3,1)	518 (2,9)	3,0	513 (3,0)	-2,0	508 (3,7)	-7,2*
Slovenië	514 (1,8)	513 (1,9)	-0,5	515 (2,0)	1,5	515 (2,2)	1,0
Italië	513 (2,8)	515 (2,7)	2,1	512 (3,3)	-1,4	505 (3,4)	-8,4*
Spanje	498 (2,1)	497 (2,3)	-1,6	497 (2,4)	-1,3	502 (2,2)	3,9*
België (Franstalig)	489 (2,4)	480 (2,5)	-9,3*	506 (2,4)	16,9*	490 (3,2)	0,9
Frankrijk	484 (2,9)	479 (3,0)	-5,3*	495 (3,1)	10,5*	480 (3,0)	-4,5
GEM EU	525 (0,6)	525 (0,6)	0,31	526 (0,6)	1,04	523 (0,7)	-2,2

Content domains mathematics

- *Measurement and geometry* > EU average
- *Data* ± EU average
- *Numbers* < EU average

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Cognitive domains mathematics

- *Knowledge* is the strongest domain within Flanders
- Significant decrease for *all domains* (compared to 2019)

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Land	Algemeen prestatie-niveau wiskunde (SE)	Kennen		Toepassen		Redeneren	
		Gemiddelde domeinscore (SE)	Vershil algemene prestatie	Gemiddelde domeinscore (SE)	Vershil algemene prestatie	Gemiddelde domeinscore (SE)	Vershil algemene prestatie
Litouwen	561 (2,9)	556 (2,8)	-4,4*	566 (2,9)	5,5*	554 (3,1)	-6,8*
Engeland	552 (2,7)	558 (2,9)	5,7*	550 (2,7)	-1,9	550 (3,3)	-2,4
Polen	546 (2,0)	539 (2,3)	-7,4*	547 (2,4)	0,9	550 (2,6)	3,6*
Ierland	546 (2,9)	551 (3,3)	4,8*	546 (3,0)	0,3	541 (2,9)	-4,8*
Roemenië	542 (4,8)	538 (4,7)	-4,2*	542 (5,0)	0,4	543 (5,2)	0,8
Nederland	537 (2,0)	540 (2,6)	2,8	536 (2,2)	-0,8	537 (2,3)	-0,2
Letland	534 (2,8)	534 (2,7)	0,0	534 (2,8)	0,1	534 (3,0)	-0,8
Noorwegen	531 (2,0)	525 (2,5)	-5,1*	531 (2,0)	0,8	534 (2,2)	3,9*
Tsjechië	530 (2,2)	534 (2,6)	3,8*	528 (2,2)	-2,0	528 (2,5)	-2,7*
Zweden	530 (2,8)	525 (2,6)	-5,3*	530 (2,6)	0,4	533 (2,8)	3,0
Bulgarije	530 (3,6)	528 (3,6)	-1,5	532 (3,7)	2,3	522 (4,6)	-8,1*
Finland	529 (2,5)	538 (2,7)	8,5*	525 (2,6)	-4,2*	528 (3,0)	-1,2
Duitsland	524 (2,1)	532 (2,7)	8,6*	519 (2,5)	-4,7*	524 (2,4)	-0,2
Denemarken	524 (2,1)	521 (2,2)	-3,2	523 (2,5)	-0,6	525 (2,5)	1,4
VLAANDEREN	521 (2,4)	534 (2,9)	12,8*	517 (2,4)	-3,9*	516 (2,8)	-4,3*
Hongarije	520 (3,6)	527 (3,5)	7,2*	515 (3,5)	-5,2*	521 (3,4)	0,3
Portugal	517 (2,8)	517 (2,8)	-0,2	516 (2,9)	-1,4	518 (2,8)	0,8
Cyprus	516 (2,5)	519 (2,4)	2,2	514 (2,6)	-2,0	515 (2,5)	-0,8
Slovakije	515 (3,1)	513 (3,3)	-2,2	514 (3,2)	-0,6	518 (3,1)	2,9
Slovenië	514 (1,8)	516 (2,0)	2,4	514 (1,8)	0,6	509 (2,0)	-4,4*
Italië	513 (2,8)	511 (2,9)	-2,6	513 (2,9)	0,2	513 (2,7)	0,3
Spanje	498 (2,1)	500 (2,7)	1,2	497 (1,9)	-0,9	500 (2,2)	1,5
België (Franstalig)	489 (2,4)	496 (2,6)	6,1*	489 (2,8)	-0,7	484 (2,6)	-5,8*
Frankrijk	484 (2,9)	484 (3,4)	-0,1	484 (3,1)	0,1	482 (2,9)	-2,5
GEM. EU	525 (0,6)	526 (0,6)	1,3	524 (0,6)	-0,7	524 (0,6)	-1,1

* Statistisch significant verschil t.o.v. algemeen gemiddelde

Cognitive domains mathematics

- *Knowing* > EU average
- *Applying & Reasoning* < EU average

Performance levels mathematics

international benchmarks

ADVANCED

test score of at least 625
apply insight and knowledge in diverse, complex situations
+ clarify reasoning

HIGH

test score of at least 550
apply conceptual insight to solve problems

MEDIUM

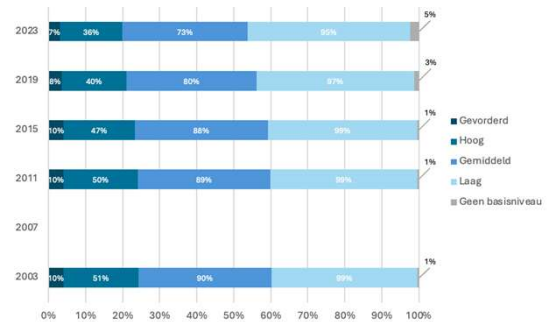
test score of at least 475
be able to apply basic knowledge in simple situations

LOW

test score of at least 400
Only basic knowledge of mathematics

Performance levels mathematics

- Compared to 2019 sharpest decrease for performance level High and Medium.
- 5% of Flemish pupils do not achieve a basic level in mathematics



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Performance levels mathematics international

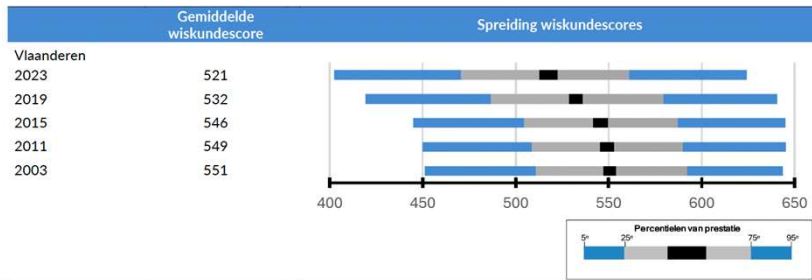
- Flanders has 7% advanced achievers
 - Similar to Denmark, New Zealand and Italy
 - In other countries, these percentages for this highest level of performance are clearly higher.
 - England 22%
 - Lithuania 20%
 - Ireland 16%
 - Roemenia 16%

Flanders has few top performers for mathematics

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Mathematics Performance

Spread over time

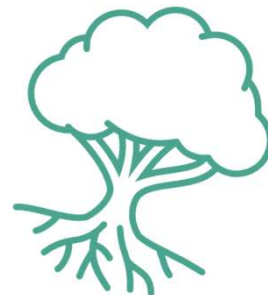


Bron: IEA's Trends in International Mathematics and Science Study - TIMSS 2023

- Homogeneity of math scores decreases

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Sciences: content and cognitive domains



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Sciences

- **Content domains**
 - **Biology (45%)**

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Sciences - Biology

- **Characteristics & life cycles of plants and animals, relationships within ecosystems, health and the human body**

Example:

The students must be able to reason about the requirements (light) for growing a plant to explain why plant A grows well and plant B does not.

John investigated the effect of different amounts of light on two identical plants. He put the plants in identical pots with the same kind of soil and the same amount of water. John put Plant A near the window and put Plant B inside a closet with the door closed. After two weeks, the plants looked like this:



Why is Plant B that was kept in the closet less healthy than Plant A that was kept by the window?

A is healthy because it had light.

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Sciences

- **Content domains**

- **Biology (45%)**

Characteristics & life cycles of plants and animals, relationships within ecosystems, health and the human body

- **Physics (35%)**

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Sciences – Physics

- **Properties of matter (solid, liquid, gas)**
- **Sources and forms of energy (electricity, heat, light, sound)**
- **Forces and motion (e.g., magnetism)**

- **For example:**

The students must know and indicate which material conducts heat best.

Jenny stirs a pot of boiling soup and leaves her spoon in the pot.
 Later, the spoon is too hot to pick up.
 What material is the spoon most likely made from?

- A wood
- B rubber
- C plastic
- D metal

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Sciences

- **Content domains**

- Biology (45%)

- Characteristics & life cycles of plants and animals, relationships within ecosystems, health and the human body

- Physics (35%)

- Properties of matter, energy sources and forms, forces and motion

- **Geography (20%)**

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Sciences - Geography

- **Characteristics of the Earth, natural resources**
- **Weather & climate**
- **Ecology and environment (pollution)**

- **For example:**

Students must know that the position of the Earth relative to the sun determines the seasons on Earth and that these seasons can differ depending on the location on Earth.

The diagram shows the Earth orbiting the Sun.



What season is it in City A in this diagram?

- A winter
- B spring
- C summer
- D autumn

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Sciences

Content domains

- **Biology (45%)**
Characteristics & life cycles of plants and animals, relationships within ecosystems, health and the human body
- **Physics (35%)**
Properties of matter, energy sources and forms, forces and motion
- **Geography (20%)**
Characteristics of the Earth, natural resources, weather, climate, environmental changes, the solar system

Cognitive domains

- **Knowledge (40%)**

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Sciences – Knowledge

Students demonstrate that they:

- **Recognize and name facts, concepts, and procedures**
- **Can give examples of known subject matter**
- **Can correctly reproduce basic knowledge**

For example:

The students know that bacteria/viruses can be transmitted through contact



George has a cold. He coughs into his hands to help stop spreading germs to his sister.
How could germs from George's cough still spread to his sister?

If George touches his sister, he will get his germs on her

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Sciences

Content domains

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Characteristics & life cycles of plants and animals, relationships within ecosystems, health and the human body
- **Physics (35%)**
Properties of matter, energy sources and forms, forces and motion
- **Geography (20%)**
Characteristics of the Earth, natural resources, weather, climate, environmental changes, the solar system

Cognitive domains

- **Knowledge (40%)**
knowledge of concepts and facts, simple operations, and classifications
- **Application (40%)**

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Sciences – Application

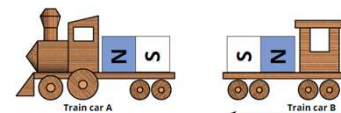
Students use their knowledge to:

- **Compare, explain, and interpret information**
- **Understand and apply models**
- **Solve practical problems**

For example:

The students have knowledge of magnetism and can apply this knowledge to predict the movement of the train.

The picture shows two toy train cars carrying magnets.



Ahmad moves Train car B toward Train car A.

What will happen to Train car A?

(Click one box.)

- Train car A will move away from Train car B.
- Train car A will move toward Train car B.

Explain your answer.

Like poles repel

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Sciences

Content domains

- **Biology (45%)**
Characteristics & life cycles of plants and animals, relationships within ecosystems, health and the human body
- **Physics (35%)**
Properties of matter, energy sources and forms, forces and motion
- **Geography (20%)**
Characteristics of the Earth, natural resources, weather, climate, environmental changes, the solar system

Cognitive domains

- **Knowledge (40%)**
knowledge of concepts and facts, simple operations, and classifications
- **Application (40%)**
applying knowledge to solve problems and issues
- **Reasoning (20%):**

45

Sciences – Reasoning

Students are challenged to:

- Solve problems in new or complex situations
- Logically combine multiple steps
- Make connections and draw conclusions

**No sample items released*

46

Sciences

Content domains

- **Biology (45%)**
Characteristics & life cycles of plants and animals, relationships within ecosystems, health and the human body
- **Physics (35%)**
Properties of matter, energy sources and forms, forces and motion
- **Geography (20%)**
Characteristics of the Earth, natural resources, weather, climate, environmental changes, the solar system

Cognitive domains

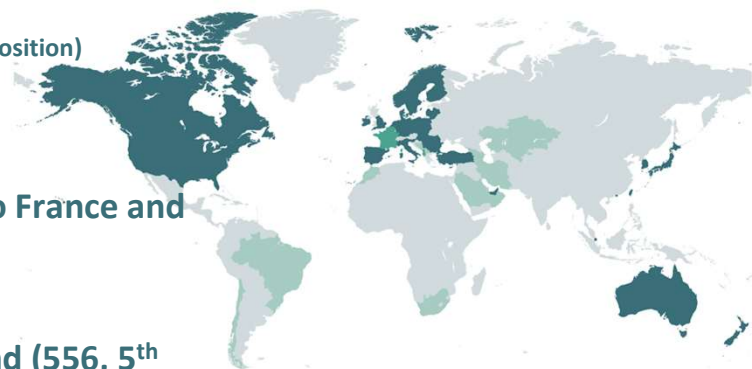
- **Knowledge (40%)**
knowledge of concepts and facts, simple operations, and classifications
- **Application (40%)**
applying knowledge to solve problems and issues
- **Reasoning (20%):**
skills that go beyond what was commonly practiced, explaining the thought process, problems that require various steps

International results sciences

- **Flanders 488 points (35th position)**
- **INT_AVE 494 points**

Flanders scores similarly to France and Cyprus

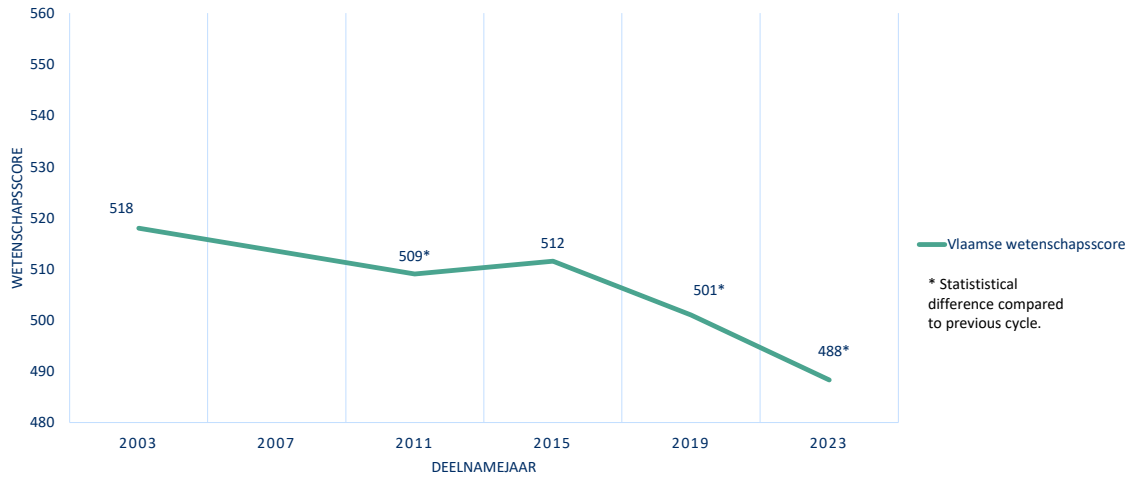
Top EU performers: England (556, 5th position), Poland (550, 7th position), Finland (542, 10th position)



Legend: Country scores compared to Flanders

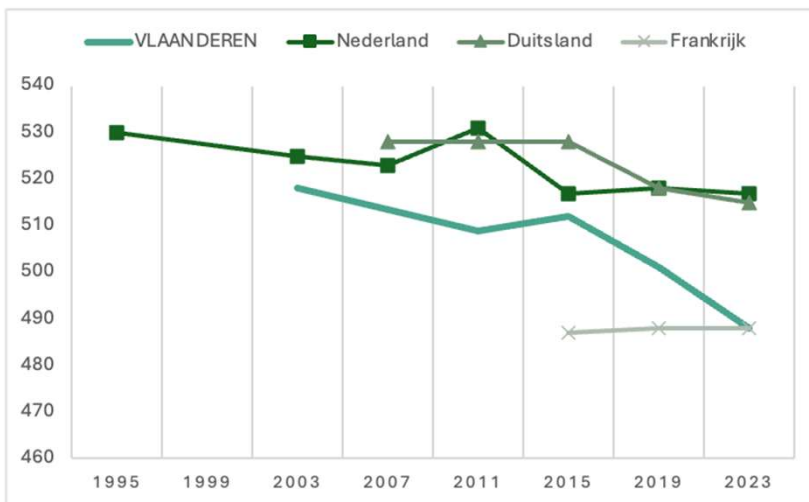
- Significant hoger
- Gelijkwaardig
- Significant lager

Trend performance sciences in Flanders



49

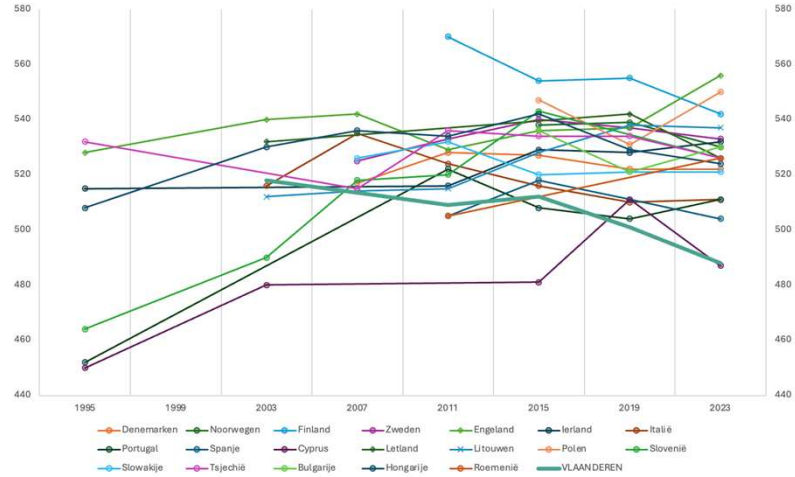
Trend performance sciences neighboring countries



50

Trend performance sciences EES

- Flanders is at the bottom of the European ranking
- Most other countries are rising or stagnating
- Flanders is the sharpest international decliner since 2015



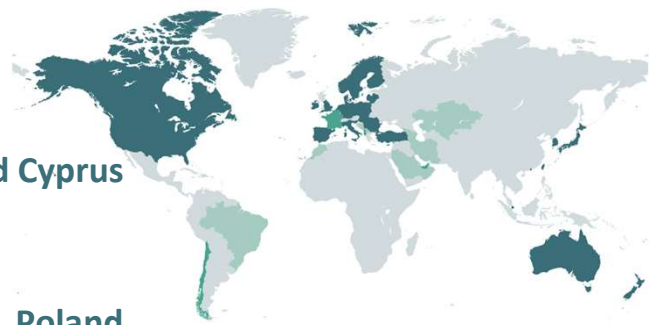
51

International results environmental knowledge (sciences component)

- Flanders 489 points

Only French-speaking Belgium and Cyprus perform worse (within the EU)

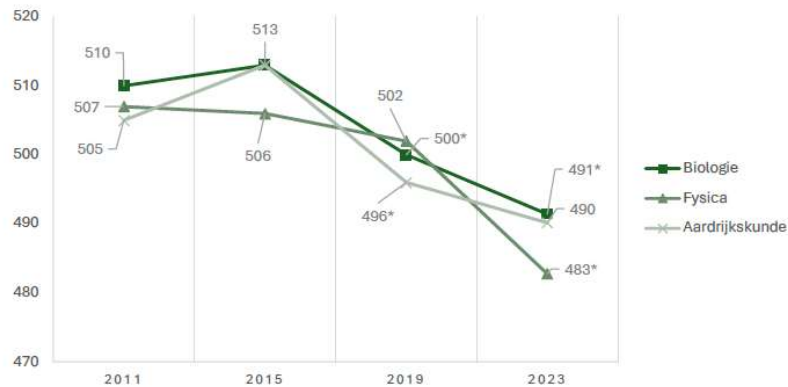
Top EU performers: England (557), Poland (557), Finland (542)



Legende: Landen scoren t.o.v. Vlaanderen

- Significat hoger
- Gelijkwaardig
- Significat lager

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Content domains sciences

- Significant decrease for Biology and Physics (compared to 2019)
- Significant decrease for all domains compared to 2011
- Greater spread across the domains compared to 2011

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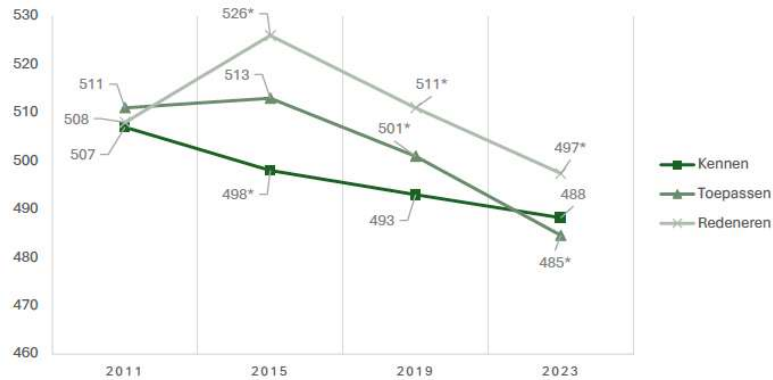
Land	Algemeen prestatieniveau Wetenschappen (SE)	Biologie		Fysica		Aardrijkskunde	
		Gemiddelde domeinscore (SE)	Vershil algemene prestatie	Gemiddelde domeinscore (SE)	Vershil algemene prestatie	Gemiddelde domeinscore (SE)	Vershil algemene prestatie
Engeland	556 (2,6)	555 (3,0)	-1	558 (3,1)	1	554 (3,5)	-2
Polen	550 (2,2)	550 (2,7)	0	549 (2,4)	-1	552 (2,8)	2
Finland	542 (2,9)	543 (3,0)	1	537 (2,8)	-5*	551 (3,0)	9*
Litouwen	537 (2,9)	531 (2,6)	-6*	544 (2,9)	7*	535 (3,4)	-2
Zweden	533 (3,2)	532 (3,5)	-1	532 (3,4)	-1	537 (4,2)	5
Ierland	532 (3,2)	535 (3,6)	3	528 (3,4)	-4*	534 (4,1)	2
Noorwegen	530 (2,6)	534 (3,0)	3	520 (2,8)	-10*	543 (3,0)	13*
Bulgarije	530 (4,8)	530 (5,1)	0	527 (5,0)	-3	535 (6,0)	6
Roemenië	526 (4,8)	524 (5,1)	-3	530 (5,0)	4	526 (5,2)	0
Tsjechië	526 (2,3)	529 (2,0)	3*	525 (2,4)	-1	520 (3,0)	-6*
Slovenië	526 (2,3)	520 (2,3)	-6*	533 (2,3)	7*	523 (2,8)	-2
Lëtland	526 (3,0)	518 (3,5)	-7*	533 (3,7)	8*	522 (3,9)	-4
Hongarije	524 (3,2)	527 (3,3)	3	514 (3,1)	-10*	534 (3,9)	10*
Denemarken	522 (2,6)	531 (2,7)	9*	510 (2,9)	-12*	525 (2,9)	3
Slovakije	521 (3,3)	519 (3,7)	-2	523 (3,7)	2	519 (3,8)	-2
Nederland	517 (2,9)	518 (3,2)	1	509 (2,5)	-8*	527 (2,9)	10*
Duitsland	515 (2,8)	515 (2,8)	0	515 (2,8)	0	512 (3,4)	-4
Portugal	511 (2,3)	511 (2,9)	0	507 (2,7)	-4	516 (2,9)	5*
Italië	511 (2,5)	510 (2,9)	0	510 (2,6)	-1	508 (3,1)	-3
Spanje	504 (2,1)	502 (2,4)	-2	505 (2,4)	1	505 (2,6)	1
VLAANDEREN	488 (2,6)	491 (2,6)	3*	483 (2,8)	-6*	490 (3,4)	2
Frankrijk	488 (3,0)	487 (3,5)	-1	485 (3,0)	-3	489 (4,2)	1
Cyprus	487 (3,1)	492 (3,2)	5*	485 (3,5)	-2	470 (3,8)	-17*
België (Franstalig)	481 (2,8)	478 (2,9)	-3	484 (2,3)	4	474 (3,4)	-6*
GEM_EU	520 (0,6)	520 (0,7)	0	519 (0,6)	1	521 (0,7)	1

* Statistisch significant verschil t.o.v. algemeen gemiddelde

Content domains sciences

- For *all domains*, Flanders is at the bottom of the European ranking.
- For *Physics*, all other European education systems perform better.

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Cognitive domains sciences

- Reasoning is the strongest domain within Flanders
- Significant decrease for Reasoning & Application (compared to 2019)

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Land	Algemeen prestatieniveau Wetenschappen (SE)	Kennen		Toepassen		Redeneren	
		Gemiddelde domeinscore (SE)	Vershil algemene prestatie	Gemiddelde domeinscore (SE)	Vershil algemene prestatie	Gemiddelde domeinscore (SE)	Vershil algemene prestatie
Engeland	556 (2,4)	555 (3,1)	-1	558 (3,0)	1	556 (2,8)	-1
Polen	550 (2,2)	548 (2,0)	-2	553 (2,3)	3	546 (2,5)	-4
Finland	542 (2,9)	541 (2,9)	-1	545 (2,9)	3*	540 (3,0)	-2
Litouwen	537 (2,9)	537 (2,7)	0	533 (2,7)	-4*	543 (2,5)	6*
Zweden	533 (3,2)	523 (3,8)	-10*	532 (3,3)	0	546 (3,5)	14*
Ierland	532 (3,2)	534 (3,1)	2	530 (3,7)	-2	531 (3,3)	-1
Noorwegen	530 (2,6)	529 (2,5)	-2	530 (2,4)	0	534 (3,1)	3
Bulgarije	530 (4,8)	535 (5,0)	5*	528 (5,0)	-2	523 (5,3)	-6*
Roemenië	526 (4,8)	523 (4,7)	-3	521 (4,9)	-5*	540 (4,9)	14*
Tsjechië	526 (2,3)	524 (2,6)	-2	523 (2,3)	-3	529 (2,9)	3
Slovenië	526 (2,3)	524 (2,2)	-2	534 (2,6)	8*	512 (2,6)	-13*
Letland	526 (3,0)	522 (3,0)	-4	525 (3,4)	0	529 (3,7)	4
Hongarije	524 (3,2)	522 (3,7)	-3	524 (3,6)	-1	526 (3,6)	2
Denemarken	522 (2,6)	521 (2,7)	-2	520 (3,3)	-2	528 (2,7)	6*
Slovakije	521 (3,3)	524 (3,4)	4	520 (3,6)	-1	517 (4,6)	-4
Nederland	517 (2,9)	518 (3,1)	1	513 (2,5)	-4	520 (3,0)	3
Duitsland	515 (2,8)	515 (2,5)	-1	512 (2,7)	-4*	516 (2,9)	0
Portugal	511 (2,3)	506 (2,7)	-5*	511 (3,5)	0	512 (2,8)	1
Italië	511 (2,5)	511 (2,9)	1	508 (2,8)	-2	506 (2,7)	-4*
Spanje	504 (2,1)	508 (2,3)	4*	502 (2,0)	-3	498 (2,5)	-6*
VLAANDEREN	488 (2,6)	488 (3,6)	0	485 (2,5)	-1	477 (3,4)	-9*
Frankrijk	488 (3,0)	491 (2,9)	3	487 (3,5)	-1	479 (3,5)	-9*
Cyprus	487 (3,1)	480 (3,6)	-7*	493 (3,1)	6*	487 (2,9)	0
België (Franstalig)	481 (2,8)	478 (2,8)	-2	480 (3,1)	0	483 (2,5)	2
GEM. EU	520 (0,6)	519 (0,6)	1	519 (0,7)	1	521 (0,7)	1

* Statistisch significant verschil t.o.v. algemeen gemiddelde

Cognitive domains sciences

- Flanders is at the bottom of the European rankings in all domains.

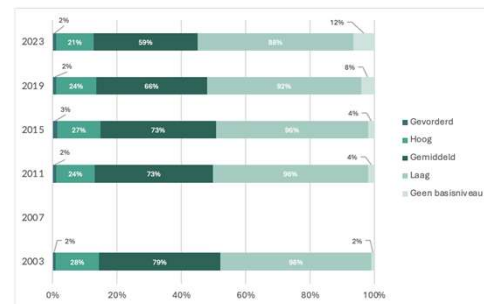
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Performance levels sciences

benchmark levels

ADVANCED - HIGH - MEDIUM - LOW

- Compared to 2019, there is a significant decrease for the Low, Average, and High performance levels.
- 12% of Flemish pupils do not achieve a basic level in science.



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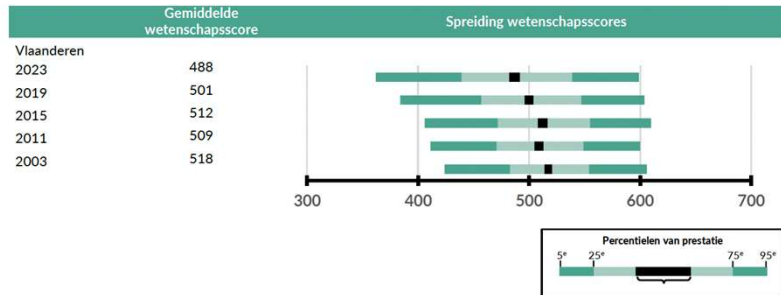
Performance levels sciences

- Flanders has only 2% top performers (advanced performance level)
- Similar to the French-speaking community, France, South Africa, Saudi Arabia, Iran, and Jordan
- In other countries, these percentages for this highest performance level are clearly higher
 - England 19%
 - Bulgaria 17%
 - Poland 14%
 - Finland 13%
- Flanders has hardly any top performers in the sciences

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Sciences Performance

Spread over time



- Homogeneity of sciences scores decreases

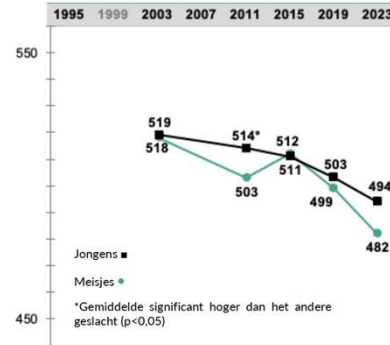
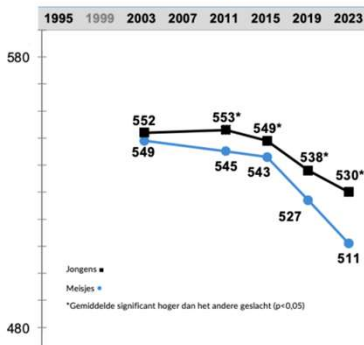
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Conclusions performance

- Decline across virtually all content and cognitive domains compared to previous cycles
- For mathematics, Flanders hovers around the EU average
- For science, we are at the bottom of the rankings

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Gender differences in TIMSS



Gender differences in TIMSS: international

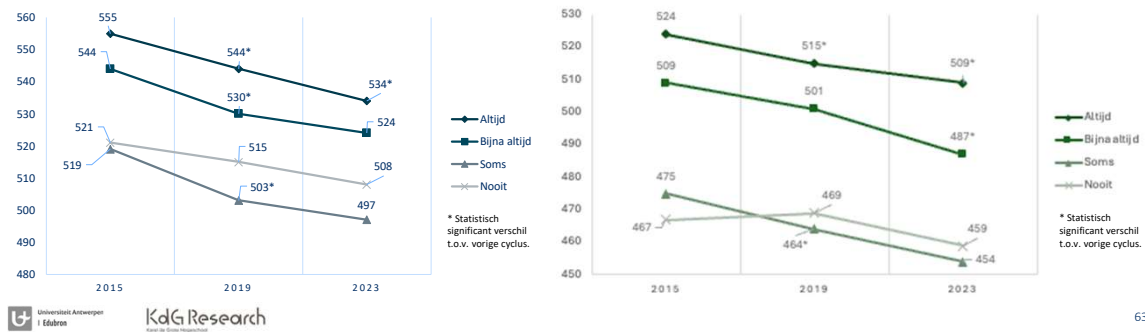
Land	Meisjes		Jongens		Verschil	Meisjes scoren hoger	Jongens scoren hoger	Land	Meisjes		Jongens		Verschil	Meisjes scoren hoger	Jongens scoren hoger
	% ln.	Gem. score	% ln.	Gem. score					% ln.	Gem. score	% ln.	Gem. score			
Zuid-Afrika	50 (0,7)	378 (8,7)	50 (0,7)	388 (4,3)	-9 (9,9)			Zuid-Afrika	50 (0,7)	328 (5,2)	50 (0,7)	289 (5,3)	-39 (4,7)		
Bahrein	48 (1,1)	492 (5,3)	52 (1,1)	459 (4,8)	-32 (6,4)			Bahrein	48 (1,1)	492 (5,3)	52 (1,1)	459 (4,8)	-32 (6,4)		
Saoedi-Arabië	49 (1,0)	448 (5,9)	51 (1,0)	412 (4,9)	-32 (7,3)			Saoedi-Arabië	49 (1,0)	448 (5,9)	51 (1,0)	412 (4,9)	-32 (7,3)		
Jordan	52 (2,6)	431 (8,4)	48 (2,6)	422 (5,8)	-9 (9,9)			Jordan	52 (2,6)	428 (7,7)	48 (2,6)	406 (5,4)	-22 (9,0)		
Bahrein	48 (1,1)	466 (5,3)	52 (1,1)	458 (5,1)	-8 (6,3)			Koeweit	51 (2,1)	383 (6,6)	49 (2,1)	363 (8,1)	-20 (9,8)		
Azerbeidzjan	46 (0,8)	496 (4,1)	54 (0,8)	492 (3,6)	-3 (3,3)			Iran	49 (1,6)	442 (5,5)	51 (1,6)	423 (6,3)	-19 (8,3)		
Noord-Macedonië	50 (0,7)	474 (3,7)	50 (0,7)	474 (4,1)	0 (3,1)			Marokko	48 (0,9)	397 (5,7)	52 (0,9)	384 (5,6)	-13 (3,9)		
Oman	50 (0,6)	421 (3,9)	50 (0,6)	422 (4,4)	1 (2,3)			Oman	50 (0,6)	439 (4,3)	50 (0,6)	426 (4,7)	-13 (2,9)		
Amerië	49 (1,0)	512 (3,3)	51 (1,0)	513 (3,0)	-2 (2,9)			Azerbeidzjan	46 (0,8)	428 (3,4)	54 (0,8)	416 (3,7)	-11 (2,8)		
Marokko	48 (0,9)	392 (4,9)	52 (0,9)	394 (5,2)	2 (4,1)			Finland	49 (0,9)	547 (2,9)	51 (0,9)	537 (3,1)	-10 (2,5)		
Saoedi-Arabië	49 (1,0)	418 (6,0)	51 (1,0)	421 (5,2)	-3 (7,9)			Albanë	48 (1,8)	495 (4,8)	52 (1,8)	487 (5,0)	-8 (4,1)		
Albanë	48 (1,8)	510 (5,9)	52 (1,8)	513 (5,4)	-3 (3,7)			Noord-Macedonië	50 (0,7)	442 (4,2)	50 (0,7)	435 (4,3)	-8 (3,5)		
Bosnië en Herzegovina	50 (1,1)	445 (3,4)	50 (1,1)	449 (3,8)	3 (3,1)			Bosnië en Herzegovina	50 (1,1)	451 (3,5)	50 (1,1)	446 (4,7)	-6 (3,6)		
Bulgarije	47 (0,8)	528 (3,8)	53 (0,8)	532 (4,2)	3 (3,5)			Ierland	49 (1,3)	534 (3,9)	51 (1,3)	530 (3,5)	-4 (3,8)		
Georgië	50 (0,8)	495 (2,5)	50 (0,8)	500 (3,7)	5 (3,8)			Georgië	50 (0,8)	497 (4,0)	50 (0,8)	463 (3,6)	-4 (3,2)		
Oezbekistan	49 (0,9)	441 (3,6)	51 (0,9)	446 (3,5)	6 (3,2)			Litouwen	49 (0,8)	539 (3,0)	51 (0,8)	535 (3,3)	-4 (2,5)		
Finland	49 (0,9)	526 (2,8)	51 (0,9)	532 (2,9)	6 (2,7)			Roemenië	49 (1,0)	529 (5,7)	51 (1,0)	545 (5,3)	6 (4,2)		
Roemenië	49 (1,0)	529 (5,7)	51 (1,0)	545 (5,3)	6 (4,2)			Letland	49 (1,2)	527 (3,5)	51 (1,2)	524 (3,4)	-4 (3,2)		
Ierland	49 (1,3)	542 (3,8)	51 (1,3)	549 (3,4)	6 (4,0)			Bulgarije	47 (0,8)	531 (4,8)	53 (0,8)	529 (5,5)	-2 (3,9)		
Chinees Taipei	48 (0,5)	609 (2,0)	52 (0,5)	611 (2,2)	2 (2,3)			Roemenië	49 (1,0)	527 (4,9)	51 (1,0)	525 (5,2)	-2 (3,4)		
Koeweit	51 (2,1)	378 (6,1)	49 (2,1)	386 (6,4)	8 (8,9)			Noorwegen	50 (0,8)	531 (3,0)	50 (0,8)	530 (2,8)	-2 (2,7)		
Letland	49 (1,2)	530 (3,6)	51 (1,2)	538 (3,0)	8 (3,6)			Duitsland	49 (0,7)	516 (3,1)	51 (0,7)	515 (3,3)	-2 (3,0)		
Slovenië	49 (0,8)	509 (2,2)	51 (0,8)	519 (2,2)	10 (2,5)			Denemarken	51 (0,8)	523 (2,9)	49 (0,8)	521 (2,8)	-1 (2,6)		
Japan	51 (0,5)	486 (2,5)	49 (0,5)	494 (2,7)	10 (2,5)			Polen	50 (0,9)	550 (2,7)	50 (0,9)	549 (2,6)	-1 (2,9)		
Kosovo	48 (0,9)	446 (3,4)	52 (0,9)	457 (4,3)	11 (3,5)			Ver. Arabische Emiraten	49 (0,7)	494 (2,1)	51 (0,7)	496 (2,3)	1 (2,6)		
Polen	50 (0,9)	541 (2,4)	50 (0,9)	551 (2,7)	11 (3,2)			Armenië	51 (0,8)	532 (3,3)	49 (0,8)	534 (3,7)	2 (2,8)		
Servië	51 (0,9)	518 (3,5)	49 (0,9)	528 (4,0)	11 (3,7)			Chili	49 (1,0)	486 (2,8)	51 (1,0)	498 (3,2)	2 (2,8)		
Montenegro	48 (0,8)	471 (2,7)	52 (0,8)	483 (2,1)	12 (2,4)			Spanje	47 (1,1)	478 (3,1)	53 (1,1)	480 (3,2)	2 (3,4)		
Singapore	49 (0,5)	609 (3,1)	51 (0,5)	621 (3,1)	12 (2,4)			Nieuw-Zeeland	49 (0,6)	503 (2,1)	51 (0,6)	505 (2,7)	2 (2,3)		
Litouwen	49 (0,8)	554 (3,2)	51 (0,8)	567 (3,2)	13 (2,5)			Qatar	49 (0,9)	516 (3,5)	51 (0,9)	518 (3,4)	3 (3,9)		
Brazilië	50 (0,6)	394 (3,5)	50 (0,6)	406 (4,0)	13 (2,9)			Kosovo	49 (1,2)	471 (4,5)	51 (1,2)	474 (4,6)	3 (3,5)		
Kazachstan	49 (0,6)	480 (3,9)	51 (0,6)	494 (3,8)	13 (2,6)			Turkije	48 (0,9)	401 (3,1)	52 (0,9)	405 (4,6)	3 (3,2)		
Duitsland	49 (0,7)	517 (2,3)	51 (0,7)	530 (2,5)	13 (2,6)			Servië	48 (1,2)	568 (3,8)	52 (1,2)	573 (4,0)	4 (3,8)		
Ver. Arabische Emiraten	49 (0,7)	491 (1,8)	51 (0,7)	505 (1,5)	14 (2,2)			Turkije	51 (0,9)	508 (3,3)	49 (0,9)	512 (4,0)	4 (3,6)		
Hongkong	49 (1,2)	587 (4,3)	51 (1,2)	601 (4,4)	14 (3,3)			Engeland	50 (0,9)	555 (2,9)	50 (0,9)	539 (3,4)	4 (3,4)		
Turkije	48 (1,2)	546 (4,5)	52 (1,2)	560 (5,0)	14 (4,7)			Montenegro	48 (0,8)	458 (2,3)	52 (0,8)	463 (2,5)	4 (2,6)		
Noorwegen	50 (0,8)	523 (2,4)	50 (0,8)	538 (2,4)	15 (2,7)			Oezbekistan	49 (0,9)	410 (3,5)	51 (0,9)	414 (4,1)	4 (3,4)		
Tsjechië	49 (0,7)	523 (2,2)	51 (0,7)	538 (2,8)	15 (2,6)			Kazachstan	49 (0,6)	464 (3,7)	51 (0,6)	469 (3,9)	5 (2,9)		
Denemarken	51 (0,8)	516 (2,4)	49 (0,8)	532 (2,6)	15 (2,6)			Slovenië	49 (0,8)	523 (2,6)	51 (0,8)	528 (2,7)	5 (2,5)		
Zweden	51 (0,8)	522 (2,0)	49 (0,8)	538 (3,3)	16 (2,8)			Cyprus	51 (0,6)	518 (2,2)	49 (0,6)	524 (2,4)	6 (2,0)		
Chili	47 (1,1)	435 (3,0)	53 (1,1)	452 (3,3)	17 (2,9)			Frankrijk	48 (0,8)	484 (3,4)	50 (0,8)	492 (3,1)	9 (2,6)		
Slovenië	50 (0,9)	506 (3,8)	50 (0,9)	523 (3,1)	17 (3,2)			Brazilië	50 (0,6)	420 (3,7)	50 (0,6)	430 (3,9)	9 (2,9)		
Zuid-Korea	50 (0,8)	586 (3,1)	50 (0,8)	603 (2,9)	17 (2,9)			Italië	48 (0,8)	506 (2,6)	52 (0,8)	515 (3,0)	9 (2,7)		
Nederland	50 (0,8)	528 (2,5)	50 (0,8)	546 (2,4)	17 (2,8)			Nederland	50 (0,8)	514 (3,1)	50 (0,8)	520 (3,2)	6 (2,4)		
Spanje	49 (0,6)	489 (2,1)	51 (0,6)	507 (2,6)	18 (2,1)			Japan	51 (0,5)	552 (2,5)	49 (0,5)	558 (2,8)	6 (2,3)		
Verenigde Staten	49 (1,2)	508 (3,0)	51 (1,2)	526 (3,5)	18 (2,1)			Tsjechië	49 (0,7)	523 (2,4)	51 (0,7)	529 (3,1)	6 (2,9)		
Hongarije	50 (0,9)	511 (3,3)	50 (0,9)	529 (4,3)	18 (2,8)			Hongarije	50 (0,9)	521 (3,2)	50 (0,9)	527 (3,7)	6 (2,5)		
Engeland	50 (0,9)	543 (3,5)	50 (0,9)	561 (3,1)	18 (3,5)			Frankrijk	50 (0,9)	477 (3,2)	50 (0,9)	484 (2,9)	7 (2,5)		
VLAANDEREN	49 (0,7)	511 (2,0)	51 (0,7)	530 (2,8)	18 (3,5)			Verenigde Staten	49 (0,5)	529 (2,9)	51 (0,5)	536 (3,2)	7 (2,4)		
Macao SAR	48 (0,7)	572 (1,4)	52 (0,7)	592 (1,6)	20 (2,1)			Canada	49 (0,8)	506 (2,6)	51 (0,8)	526 (3,2)	21 (2,3)		
Canada	51 (0,6)	494 (2,1)	49 (0,6)	514 (2,5)	20 (2,2)			België (Frans)	50 (0,9)	479 (2,7)	50 (0,9)	500 (2,8)	21 (2,4)		
Cyprus	49 (0,8)	506 (2,6)	51 (0,8)	526 (3,2)	21 (3,2)			Nieuw-Zeeland	49 (0,9)	479 (3,0)	51 (0,9)	501 (3,3)	21 (3,3)		
België (Frans)	50 (0,9)	479 (2,7)	50 (0,9)	500 (2,8)	21 (2,4)			Qatar	49 (1,2)	453 (4,2)	51 (1,2)	474 (4,4)	21 (4,8)		
Nieuw-Zeeland	49 (0,9)	479 (3,0)	51 (0,9)	501 (3,3)	21 (3,3)			Portugal	50 (0,7)	506 (3,1)	50 (0,7)	528 (3,3)	22 (3,0)		
Qatar	49 (1,2)	453 (4,2)	51 (1,2)	474 (4,4)	21 (4,8)			Italië	48 (0,8)	501 (2,9)	52 (0,8)	524 (3,2)	22 (2,6)		
Portugal	50 (0,8)	473 (3,2)	50 (0,8)	496 (3,2)	23 (2,9)			Australië	52 (1,0)	545 (2,8)	48 (1,0)	555 (2,9)	10 (3,4)		
Italië	48 (0,8)	501 (2,9)	52 (0,8)	524 (3,2)	22 (2,6)			Hongkong	49 (1,2)	540 (4,6)	51 (1,2)	550 (3,9)	10 (3,5)		
Australië	52 (1,0)	514 (2,9)	48 (1,0)	531 (3,1)	23 (3,3)			Macao	48 (0,7)	530 (1,6)	52 (0,7)	541 (2,1)	11 (2,4)		
Frankrijk	50 (0,8)	473 (3,2)	50 (0,8)	496 (3,2)	23 (2,9)			VLAANDEREN	49 (0,7)	482 (3,2)	51 (0,7)	494 (2,8)	12 (2,8)		
INF GEM	49 (0,1)	498 (0,5)	51 (0,1)	508 (0,5)	11 (0,5)			Portugal	50 (0,7)	504 (2,7)	50 (0,7)	517 (2,9)	13 (3,1)		
								Zuid-Korea	50 (0,5)	576 (3,8)	50 (0,5)	591 (2,9)	15 (3,1)		
								INF GEM	49 (0,1)	495 (0,1)	51 (0,1)	494 (0,5)	-1 (0,1)		

Language at home

Students who always speak Dutch at home perform better than the other categories within Flanders

- MATH: always Dutch +7.5% compared to never Dutch
- SCIENCE: always Dutch +12.1% compared to never Dutch

! differences with other EU countries
(best performance ≠ always language of instruction)

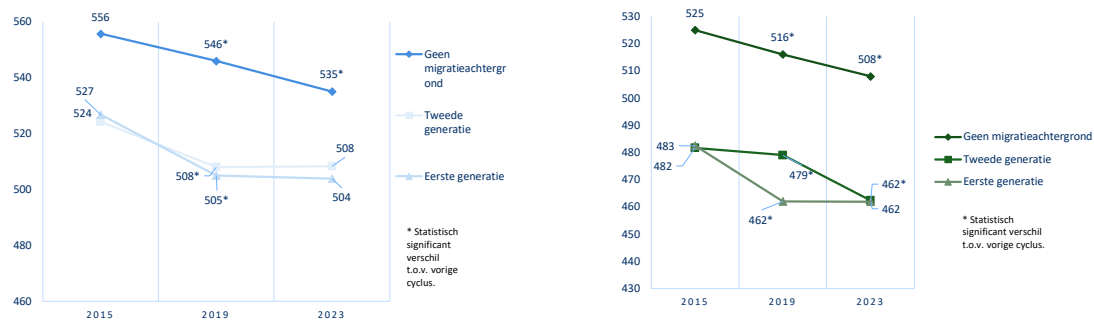


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Migration status

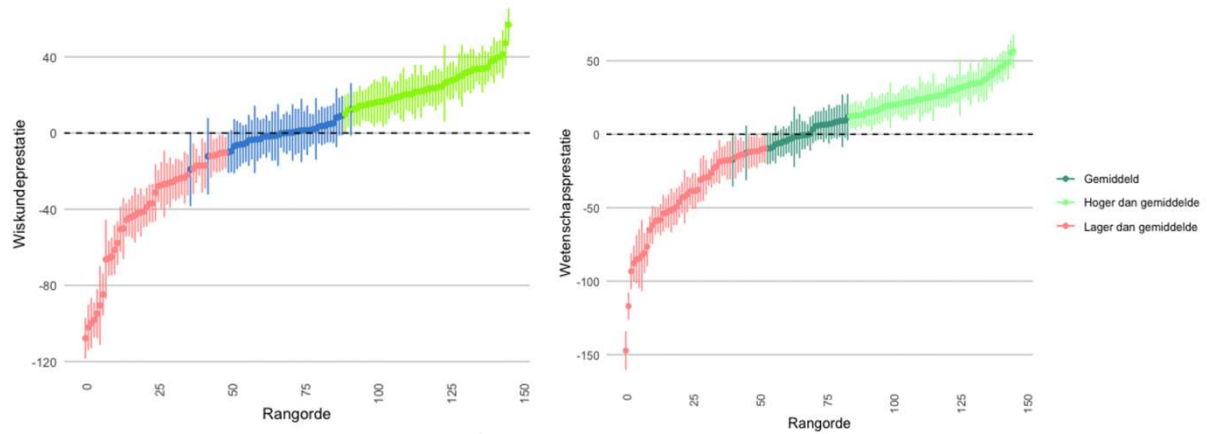
Students without a (recent) migration background perform better than the other categories within Flanders

- MATHEMATICS: +5.3% compared to 2nd generation; 6.2% compared to 1st generation
- SCIENCES: +10% compared to 2nd & 1st generation



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Performance differences between schools



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Curriculum coverage and TIMSS test

- **Greatest common denominator of various curricula**
- **Overlap but also differences with the Flemish curriculum**
 - Mathematics: 84%
 - Sciences: 54%
- **What happens if only these selection of items are used?**

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Land	2019	2022	2019	2022	Land	2019	2022	2019	2022
Taiwan	602	(1,7)	607	(1,7)	Zuid-Korea	583	(2,3)	594	(2,3)
Zuid-Korea	594	(4,0)	594	(4,0)	Taiwan	573	(1,7)	580	(1,7)
Hong Kong	594	(2,6)	598	(2,6)	Turkije (5)	570	(3,4)	575	(3,2)
Japan	591	(2,3)	590	(2,3)	Engeland	556	(2,6)	563	(2,6)
Macau	582	(1,0)	583	(1,1)	Japan	555	(2,4)	567	(2,4)
Litouwen	561	(2,9)	561	(2,9)	Australië	550	(2,3)	553	(2,3)
Turkije (5)	553	(4,1)	553	(4,0)	Polen	550	(2,2)	557	(2,5)
Engeland	552	(2,7)	553	(2,7)	Hongkong	545	(3,8)	549	(3,9)
Polen	546	(2,9)	546	(2,9)	Finland	542	(2,9)	550	(2,9)
Ierland	540	(2,0)	548	(2,1)	Litouwen	537	(2,9)	544	(3,0)
Roemenië	542	(4,8)	541	(4,9)	Macau	536	(1,4)	543	(1,3)
Nederland	537	(2,0)	538	(2,0)	Zweden	533	(3,2)	542	(3,1)
Lofland	534	(2,8)	535	(2,9)	Ierland	532	(3,2)	537	(3,2)
Noorwegen (5)	531	(2,0)	531	(2,1)	Verenigde Staten	532	(2,8)	535	(2,9)
Tsjechië	530	(2,2)	531	(2,2)	Noorwegen	530	(2,6)	536	(2,6)
Zweden	530	(2,8)	532	(2,9)	Tsjechië	526	(2,3)	535	(2,2)
Filand	529	(2,5)	530	(2,5)	Lofland	526	(3,0)	531	(3,1)
Australië	525	(2,6)	526	(2,6)	Roemenië	526	(4,8)	534	(4,8)
Duitsland	524	(2,1)	524	(2,1)	Slovenië	526	(2,3)	535	(2,5)
Denemarken	524	(2,1)	524	(2,2)	Hongarije	524	(3,2)	528	(3,2)
Servie	523	(1,3)	523	(1,4)	Denemarken	522	(2,6)	525	(2,7)
VLAANDEREN	521	(2,4)	522	(2,4)	Canada	521	(2,0)	525	(2,1)
Hongarije	520	(3,6)	520	(3,7)	Slovakije	521	(3,3)	529	(3,3)
Portugal	517	(2,8)	517	(2,8)	Nederland	517	(2,9)	522	(3,3)
Verenigde Staten	517	(3,1)	518	(3,1)	Nieuw-Zeeland	517	(2,8)	520	(3,1)
Slovakije	515	(3,1)	516	(3,1)	Duitsland	515	(2,8)	521	(2,9)
Slovenië	514	(1,8)	514	(1,9)	Italië	511	(2,5)	517	(2,5)
Italië	513	(2,8)	511	(2,8)	Portugal	511	(2,3)	519	(2,3)
Armenië	513	(2,8)	513	(2,8)	Servie	510	(3,2)	517	(3,4)
Albanië	512	(4,9)	509	(5,0)	Spanje	504	(2,1)	509	(2,2)
Canada	504	(2,0)	504	(2,0)	Ver. Arabische Emiraten	495	(1,8)	495	(1,9)
Georgië	498	(3,1)	497	(3,1)	Albanië	491	(4,5)	494	(4,5)
Spanje	498	(2,1)	499	(2,1)	VLAANDEREN	488	(2,6)	494	(2,7)
Ver. Arabische Emiraten	498	(1,2)	498	(1,3)	Frankrijk	488	(3,0)	492	(3,1)
Nieuw-Zeeland	490	(2,6)	491	(2,6)	Franstalig België	481	(2,8)	485	(3,0)
Franstalig België	489	(2,4)	491	(2,5)	Chili	479	(2,7)	491	(2,9)
Kazakstan	487	(3,6)	487	(3,7)	Bahrein	475	(3,9)	475	(4,2)
Frankrijk	484	(2,9)	484	(2,9)	Qatar	472	(3,6)	475	(3,9)
Montenegro	477	(2,1)	477	(2,1)	Kazakstan	467	(3,5)	461	(3,6)
Noord-Macedonië	474	(3,6)	471	(3,6)	Georgië	465	(3,4)	467	(3,6)
Qatar	464	(3,5)	465	(3,5)	Montenegro	461	(2,8)	469	(2,1)
Bahrein	462	(4,1)	461	(4,2)	Armenië	457	(2,7)	455	(2,6)
Kosovo	451	(3,4)	450	(3,4)	Bosnië & Herzegovina	448	(3,7)	456	(4,1)
Bosnië & Herzegovina	447	(3,2)	447	(3,4)	Noord-Macedonië	439	(3,9)	440	(4,1)
Chili	444	(2,8)	443	(2,9)	Oman	433	(4,2)	432	(4,6)
Oezbekistan	443	(3,2)	442	(3,2)	Saudi-Arabië	428	(4,0)	420	(4,2)
Jordanië	427	(5,3)	427	(5,2)	Brazilië	425	(3,5)	428	(3,6)
Oman	421	(4,0)	420	(4,0)	Jordanië	418	(4,9)	412	(5,0)

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What happens if only this selection of items is used?

- Mathematics
 - Student scores increase by 1 point
- Sciences
 - Student scores increase by 6 points
 - Almost all other countries improve (e.g. Singapore 23 points, England 7 points)

Conclusion:
The Flemish science curriculum seems simpler than the standards within the TIMSS test

CONTEXT

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High kindergarten participation – low literacy at the start of primary school

- **Only 11% of pupils frequently participated in preschool learning activities with their parents (compared to 20% EU_GEM).**
- **According to parents (47%), the majority of Flemish pupils do not possess good literacy and numeracy skills at the start of primary school.**
- **School principals also indicate this:**
 - 98% of school principals indicate that less than 75% of pupils start primary school with basic reading and arithmetic skills.
 - 22% of school principals indicate that less than 25% of pupils possess these skills at the start.

Professionalisation needs

- **ICT integration (math/science)**
- **Fewer professionalisation activities for science than for mathematics**
- **Discrepancy between the need for professionalisation and the courses attended:**

MATHEMATICS

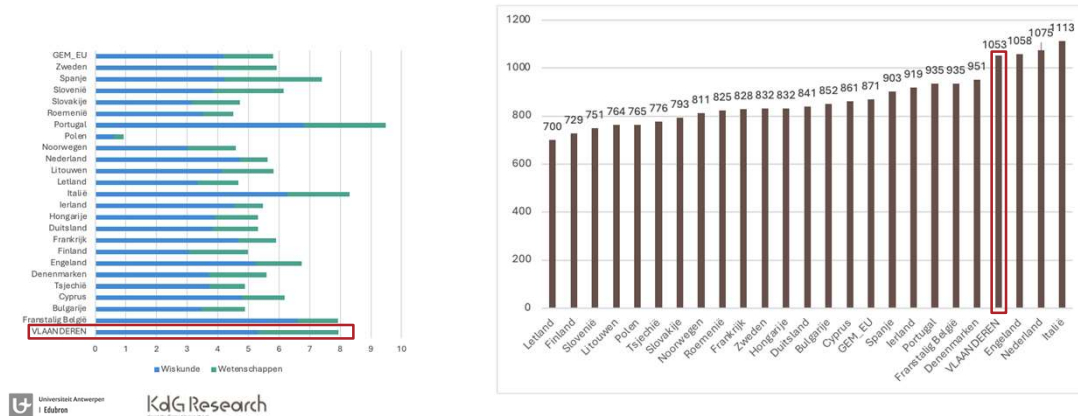
- ICT integration
- Problem-solving skills
- Evaluation
- Individual learning needs

SCIENCES

- Content of sciences
- Pedagogy and didactics
- Curriculum and curriculum
- ICT integration
- Problem-solving skills
- Evaluation
- Individual learning needs
- Integration into other domains
- Integration of environmental knowledge within sciences

Curriculum and instruction time

- Relative high instruction time



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Science Didactics: low focus on scientific thinking

- % students whose teacher applies the following in science lessons

% Flanders	TOPIC	% EU
51%	Ask questions about scientific phenomena	74%
50%	predict the outcome of an experiment	64%
6%	represent scientific phenomena	31%
7%	explain phenomena using scientific concepts	39%
17%	Conduct experiments	42%

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Resources for organising education



52% of students in Flanders attend a school where the management indicates that the lack of resources has a moderate impact on mathematics education.



For science, this rises to **70%**.



E.g.: school building, teaching materials, specialized teachers, practical materials, ICT equipment,...

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Academic focus in Flemish schools

- **42% of students attend a school where there are limited to severe discipline problems**
- **Focus of the school and the school team on the academic performance of the students is less pronounced in Flanders**

	Mean focus		Strong focus		Very strong focus	
	% pupils	Mean score	% pupils	Mean score	% pupils	Mean score
FLANDERS (MAT)	52%	513	48%	533	-	-
EU-MEAN (MAT)	43%	512	52%	534	5%	553
FLANDERS (SCI)	52%	479	48%	503	-	-
EU-MEAN (SCI)	43%	507	52%	529	5%	548

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Lessons from TIMSS 2023



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Lessons from TIMSS 2023 (1)



Since 2019, Flanders has continued to decline in both mathematics and science. Stronger students are also experiencing a setback, which was less pronounced in 2019. The group of students who do not reach a basic level in mathematics or science is increasing.



Between 2015 and 2023, Flanders experienced the sharpest decline in both mathematics and science across all participating education systems. The majority of the participating education systems are experiencing a stabilization or an increase in performance.



Increasing discrepancy in mathematics and science performance between boys and girls.

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Lessons from TIMSS 2023 (2)



More instruction hours do not appear to be associated with higher performance in mathematics and science..



Compared to other countries, Flemish schools have a less pronounced academic focus. Bullying and discipline problems also persist within Flemish schools.



Demographic shifts in the student population:

Decrease in the number of students who always speak Dutch at home (68% in 2015 ↔ 56% in 2023)

Increase in students with a (recent) migration background (33% in 2015 ↔ 40% in 2023)

Lessons from TIMSS 2023 (3)



Flemish pupils have low numeracy and literacy skills at the start of primary school, despite high participation in pre-school childcare and kindergarten education.



Compared to other countries, Flemish teachers have a significantly different level of education (bachelor's degrees). Moreover, there are striking needs for further training (e.g., regarding ICT in education), whereas participation in further training (sciences) is low.



The focus on scientific reasoning is not strongly present in Flemish education. Furthermore, the results seem to indicate that the Flemish science curriculum does not align with international standards (including the integration of ecology, environment, and climate knowledge).



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Minister Demir na slechte onderwijsresultaten: “Kleuterklas moet weer meer klas worden en minder crèche”



De nieuwste Timss-studie, die de resultaten van leerlingen voor wiskunde en wetenschappen internationaal vergelijkt, doet alle alarmbellen afgaan. Nooit scoorden de Vlaamse leerlingen zo slecht. “Ik heb hier slecht van geslapen”, zegt minister Zuhail Demir, die maatregelen aankondigt.



vrt nws
Zorgwekkend rapport voor wiskunde en wetenschappen: Vlaamse leerlingen internationaal sterkste daler sinds 2015

Trends
Wiskunde- en wetenschappenprestaties van Vlaamse leerlingen dalen tot dieptepunt: TIMSS-studie

Demir wil ingrijpen nu niveau van wiskunde en wetenschappen nog verder zakt: “We gaan meer eisen van de kinderen”

KLASSE
TIMSS: leerkrachten wiskunde en wetenschappen

De Standaard
Vlaamse leerlingen in lager onderwijs nooit slechter in wetenschappen en wiskunde: “Hier kunnen we echt niet blij mee zijn”

De Morgen
Desastreus resultaat: nergens daalden prestaties voor wetenschappen en wiskunde zo sterk als in Vlaanderen

DE TIJD
Wiskunde- en wetenschapskennis bij Vlaamse leerlingen op zorgwekkend dieptepunt

Alarmerende nieuwe cijfers in onderwijs: in 20 jaar zijn Vlaamse 10-jarigen van primus in wiskunde naar net boven Europees gemiddelde gezakt

Universiteit Antwerpen
Vlaanderen talmelt omhoog op het vlak van wiskunde- en wetenschapskennis, blijkt uit een nieuw vergelijkend internationaal rapport. De daling van de scores sinds 2015 is zelfs die sterkste van alle deelnemende landen. “Ik heb niet goed geslapen”, zegt bevoegd minister Zuhail Demir.

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Ons onderwijs vraagt om een radicale koerswijziging



*Als meertaligheid werkelijk het probleem was, zou dat wereldwijd
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Leerlingen met een migratieachtergrond verder achter dan in andere landen. Jozef Orhan Agirdag onderzochten het probleem oplossing aan.



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Je kunt niet van scholen en ouders verwachten dat ze de kwaliteit van het onderwijs alleen opkrikken



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Hoe komt het dat het onderwijs in Vlaanderen het zo slecht doet in vergelijking met andere landen, vraagt Charlotte Zwemmer zich af. Het zal dan toch niet alleen aan de slechte beheersing van het Nederlands liggen.

"We zijn school minder belangrijk gaan vinden in één generatie tijd. Dat draait je niet terug in een vingerknip"



© Jozef Heeraghe

"We zijn welvarender geworden en dat is positief, maar het maakt ons ook luiër." Zo reageert Filip Moons, docent wiskundendidactiek aan de Universiteit Utrecht en actief bij de Vlaamse Vereniging Wiskundeleraars, op de slechte Timss-resultaten.

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What can we (not) learn from ILSAs?

ILSAs: powerful diagnostic tools for

- Benchmarking
- Trend monitoring
- System-level equity analysis

ILSAs have limits

- Measurement & Sampling
- Interpretative limits
- Impact educational practices

=> not suitable form high-stakes classroom-level accountability without safeguards



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Measurement and sampling foundations

Possibilities

- rigorous IRT scaling
- international linking across cycles
- rich contextual questionnaires for multilevel analysis

Limitations

- sampling, not census
- exclusions
- differential item functioning (DIF)
- partial measurement invariance across cultures

=> constrained cross-country comparability and causal claims

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System level possibilities



Benchmarking and trend detection



Identify equity gaps and system-wide patterns



Informing national reviews



Capacity building

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Limitations and risks

Ecological inference risk

- Within-country variance?
- Cross-sectional design => no causal attribution

Political / interpretative risks

- Rankings can lead to simplistic policy transfer

Impact educational practices

- e.g., inquiry-base science education vs. teacher-led instruction

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Stakeholder use perspective

- Teachers
- Schools
- Local & school government
- Educational administration
- Researchers

Key possibilities
Key limitations
Common misuses
Recommended safeguards

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Stakeholder use: teachers

Key Possibilities

- Contextual items for pedagogy
- Professional development targeting

Key limitations

- Not diagnostic for individuals
- Low classroom reliability

Misuse

- Teaching to the test
- Narrowing curriculum

Recommended safeguards

- Use aggregated, anonymized findings
- Combine with classroom assessment

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Stakeholder use: schools

Key Possibilities

- Benchmarking with similar schools
- Identify resource gaps

Key limitations

- Small sample per school
- High SEs

Misuse

- Public league tables from small samples
- Reputational pressure

Recommended safeguards

- Use within-system comparisons
- Use confidence intervals
- Internal improvement plans

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Stakeholder use: local & school government

Key Possibilities

- Detect equity patterns
- Allocate support

Key limitations

- Aggregation masks heterogeneity
- Timing lag

Misuse

- Over-reacting to single cycle changes

Recommended safeguards

- Trend-based decisions
- Triangulate with administrative data

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Stakeholder use: educational administration

Key Possibilities

- International benchmarking
- Policy learning
- Capacity building

Key limitations

- Policy transfer without context
- Policy misuse of rankings => standardisation

Misuse

- Rapid reforms justified by rankings (ranking fetishism)
- Market-style accountability
- Causality claims (also long-term, e.g., PISA: GDP)

Recommended safeguards

- Use as one input among many
- Contextualize follow-ups
- Protect against simplistic ranking narratives

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Stakeholder use: researchers

Key Possibilities

- Rich multi-level data
- Cross-national research

Key limitations

- Measurement non-invariance
- DIF
- Cross-sectional limits

Misuse

- Ignore sampling design in analysis
- Ignore invariance in analysis

Recommended safeguards

- Test invariance
- Account for complex design
- Use longitudinal or mixed methods where possible

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Conclusions

ILSA results are diagnostic system-level inputs not prescriptive blueprints

Before policy actions:

- Triangulate with local data
- Contextual interpretation
- Enrich with qualitative evidence
- Integrate ILSA in broader M&E system
- Long-term aims ⇔ quick fixes
- Cognitive vs non-cognitive outcomes
 - Teacher guided explanation => pos. corr cognitive outcomes
 - Inquiry rich classroom practices
 - neg. corr with cognitive outcomes
 - Pos corr with non-cognitive outcomes (motivation, attitude, interest)

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Conclusions

▪ For researchers

- Report exclusions
- Report uncertainty (SE, CI)
- Test measurement invariances
- Use all plausible values
- Sampling weighing
- First, and last and always: correlation \Leftrightarrow causality

- Link with national data

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Comparison

	PISA (OECD)	TIMSS (IEA)
Organizing body	Organised by the OECD embedded in broader OECD indicators and policy work.	Organised by the IEA, a research-driven international consortium.
Primary purpose	Assesses how well 15-year-olds can apply reading, mathematics, and science knowledge to real-life situations ("literacy" focus).	Monitors students' mastery of school mathematics and science curricula ("curriculum-based achievement" focus).
Target population	Age-based sample: 15-year-olds in school, regardless of grade.	Grade-based sample: typically grade 4 and grade 8 students.
Main domains	Reading, mathematics, and science literacy; one domain is "major" in each cycle (e.g., science in 2015).	Mathematics and science achievement (with detailed content and cognitive domains).
Conceptual focus	Emphasises transfer, problem-solving, and preparedness for life and work; less tightly bound to national curricula.	Emphasises alignment with intended and implemented curricula; strong link to textbook and syllabus content.
Assessment cycle	Three-year cycle (since 2000), with rotating major domain.	Four-year cycle (since 1995), with parallel grade 4 and 8 studies.

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Comparison

	PISA (OECD)	TIMSS (IEA)
Assessment cycle	Three-year cycle (since 2000), with rotating major domain.	Four-year cycle (since 1995), with parallel grade 4 and 8 studies.
Sampling design	Two-stage stratified sampling of schools and students; designed for age-cohort comparability across systems.	Two-stage stratified sampling of schools and intact classes within target grades.
Item formats and scaling	Mix of constructed-response and selected-response items; scaled using item-response theory with plausible values for literacy scales.	Predominantly selected-response plus some constructed-response items; IRT scaling with plausible values for achievement scales.
Context questionnaires	Extensive background questionnaires for students, schools, and (in some cycles) parents and teachers; strong focus on system-level and equity indicators.	Student, teacher, and school questionnaires emphasising instructional practices, curriculum coverage, and classroom resources.

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Comparison

	PISA (OECD)	TIMSS (IEA)
Policy use and influence	Highly visible in media and policy debates; often used for benchmarking and accountability, sometimes criticised for narrowing policy agendas.	Used more by specialist communities and ministries for curriculum monitoring and trend analysis; somewhat less media-driven but influential for content-specific reforms.
Comparability between PISA and TIMSS	Age-based design and literacy focus mean results are not directly interchangeable with TIMSS; tends to favour systems where students apply knowledge flexibly.	Grade-based, curriculum-aligned design yields different rank orders; tends to favour systems with strong mastery of taught content.
Use in research on teaching and learning	Widely used to study equity, system characteristics, and inquiry-oriented or student-centred practices in science and mathematics.	Widely used to study curriculum coverage, instructional practices, and classroom factors linked to achievement.