



LE GOUVERNEMENT  
DU GRAND-DUCHÉ DE LUXEMBOURG  
Ministère de l'Éducation nationale,  
de l'Enfance et de la Jeunesse



**2<sup>nd</sup> international event**  
**Rome**  
**06<sup>th</sup> – 07<sup>th</sup> June 2019**

# Luxembourg's experience in e-assessment for learning



# Country presentation - LUXEMBOURG

2

## LUXEMBOURG in FLIP+

- Sharing content: technology-enhanced items
- Sharing knowledge and experience
- Teacher development
- Research on User eXperience
- Big data and learning strategies

# Country presentation - LUXEMBOURG

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## LUXEMBOURG in figures

- ~590k inhabitants 48% foreign residents
- 88k students, ~ 42% foreign origin
- 156 primary & 40 secondary schools
- 1 university
- 180, 000 cross-border workers  
- 45% of jobs

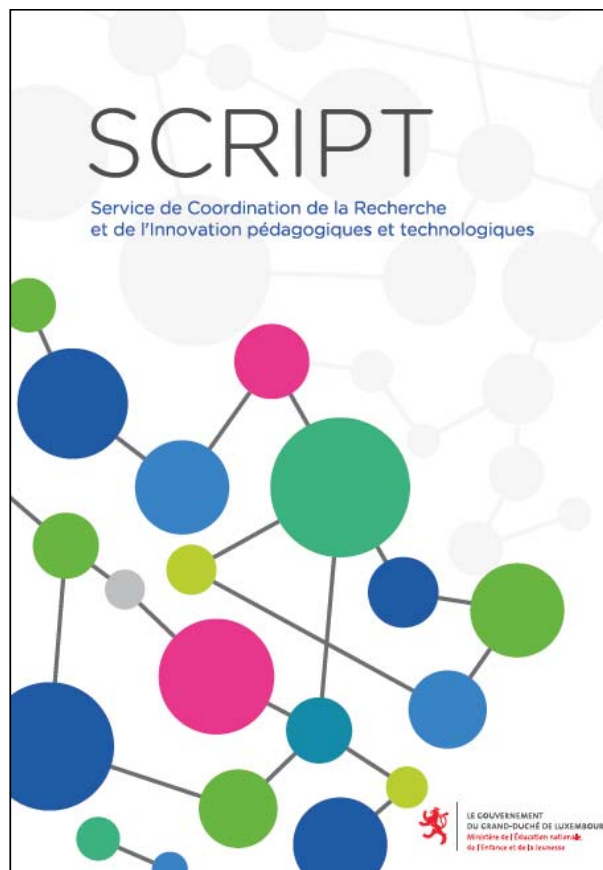






# Country presentation - LUXEMBOURG

5



**SCRIPT**  
Service de Coordination de la Recherche  
et de l'Innovation pédagogiques et technologiques

LE GOUVERNEMENT  
DU GRAND-DUCHÉ DE LUXEMBOURG  
Ministère de l'Éducation nationale  
du Sport et de la Jeunesse

The Department for the Coordination of Educational and  
Technological Research and Innovation

THE **KEY PLAYER** IN  
**EDUCATION** IN  
**LUXEMBOURG**

SCRIPT is the driving force behind the development of education in Luxembourg.  
It is responsible for implementing the priorities of educational policy.

6 TO FULFILL ALL  
ITS MISSIONS,  
THE SCRIPT HAS  
SIX DIVISIONS:

- Division of Pedagogical and Technological Innovation
- Division of Coordination of Initiatives  
and educational programs
- Curriculum Development Division
- Division of Development  
of Teaching Materials
- Division of Quality Data  
Processing and Educational  
Provision management
- School Development Division

[www.script.lu](http://www.script.lu)

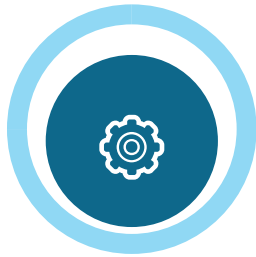
# SCRIPT - our expertise



THE **KEY PLAYER** IN  
 **EDUCATION** IN  
**LUXEMBOURG**

Innovation  
School initiatives  
Pedagogy & Didactics  
School development  
Curriculum  
Learning material  
Technology & Learning  
Assessment  
Statistics & Data  
Communication  
Data security  
Legal support  
Graphic design

# SCRIPT- Data Division



## Database management

Datalakes: link data  
content, quality,  
security



## Data production

Production,  
dissemination &  
publication: data,  
statistics for all education  
actors



## Student assessments

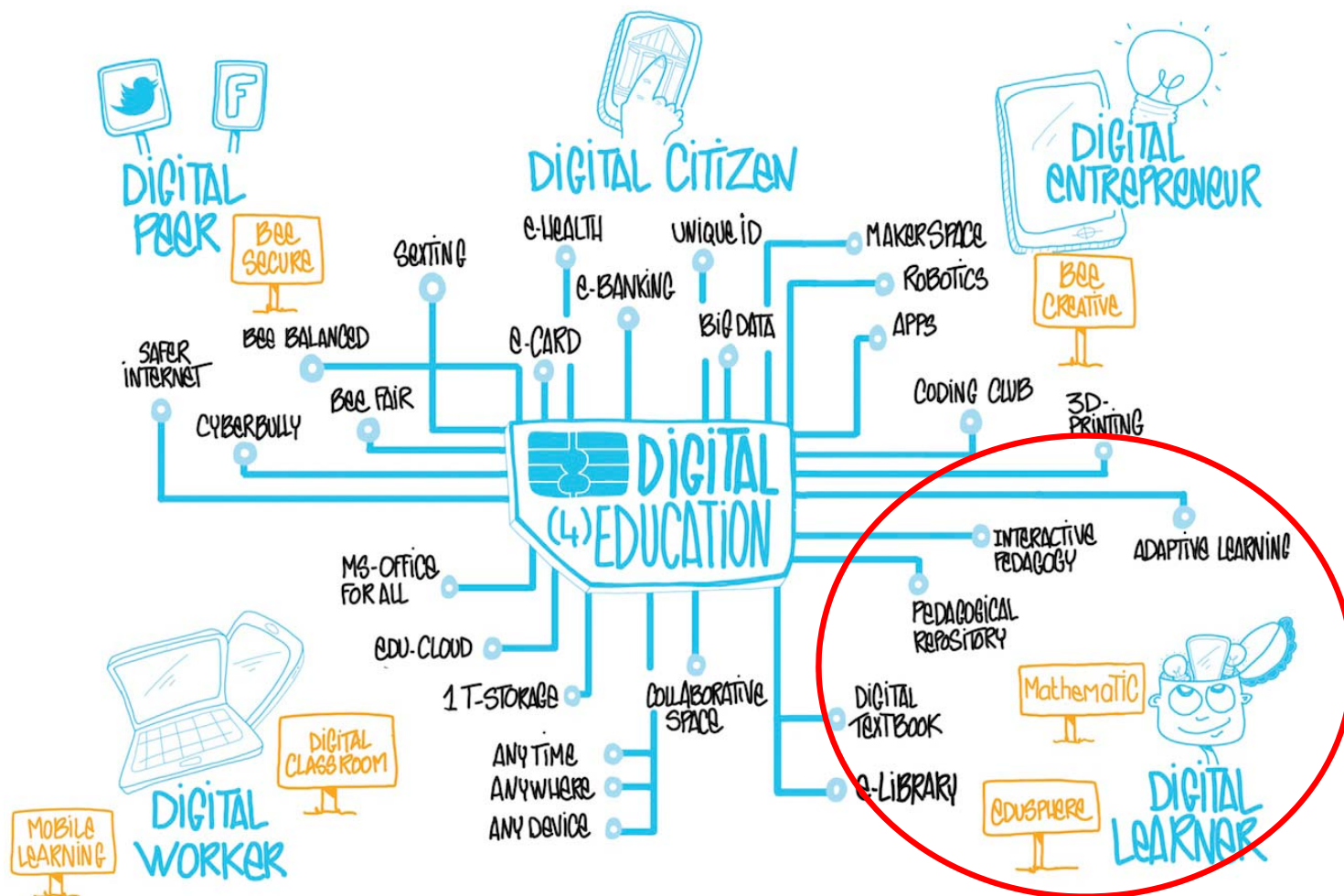
Coordination: national  
& international  
assessments



## Data use & literacy

Creation of data use  
framework, tools  
& data literacy  
programs

# Digital<sub>(4)</sub> Education - LUXEMBOURG





# MathemaTIC: personalized learning

## Assessment for learning

Adaptive

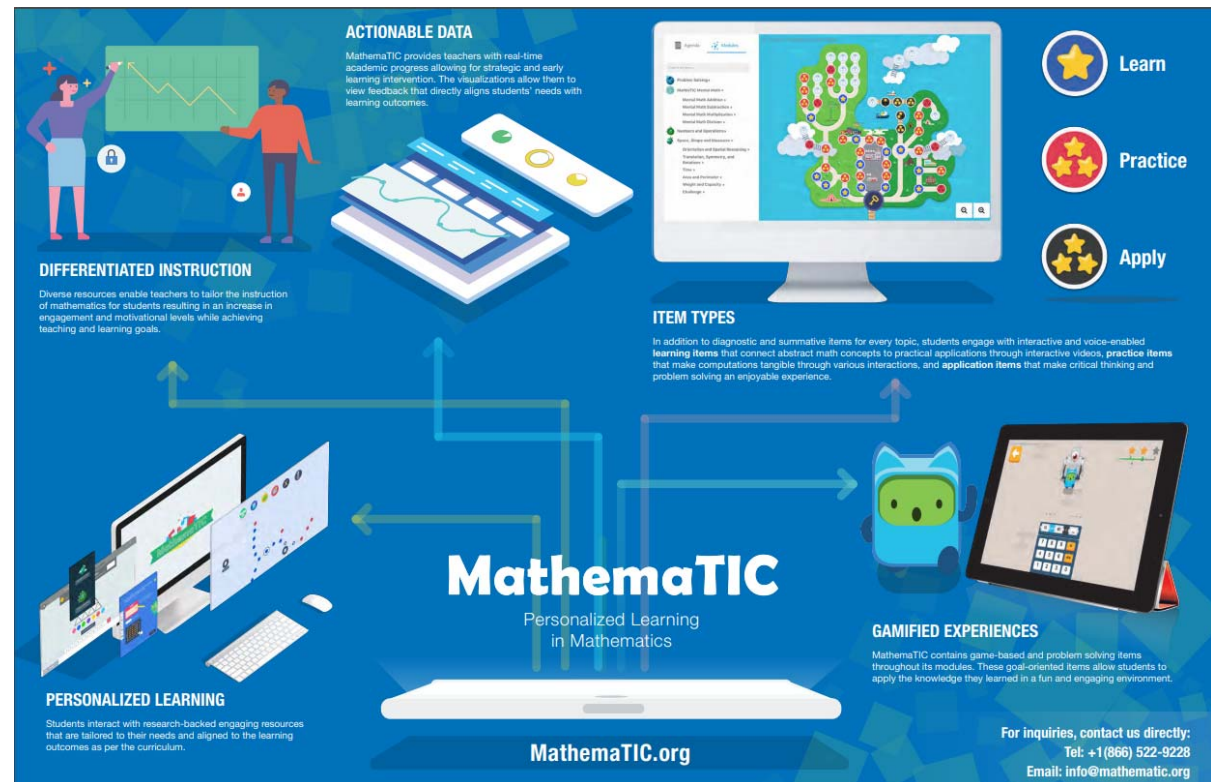
Multilingual

Intuitive

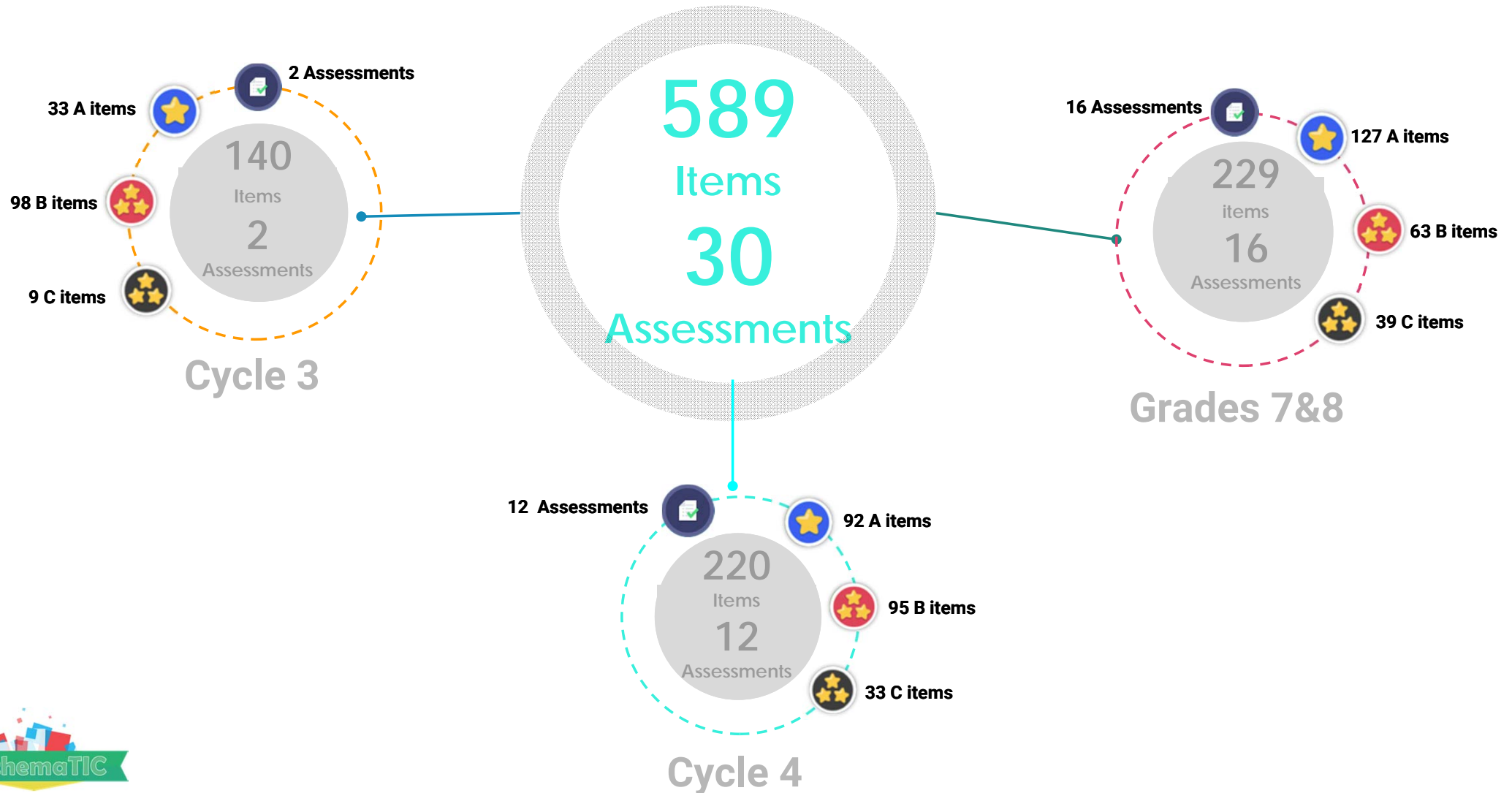
Curriculum-aligned

Tech-enhanced items

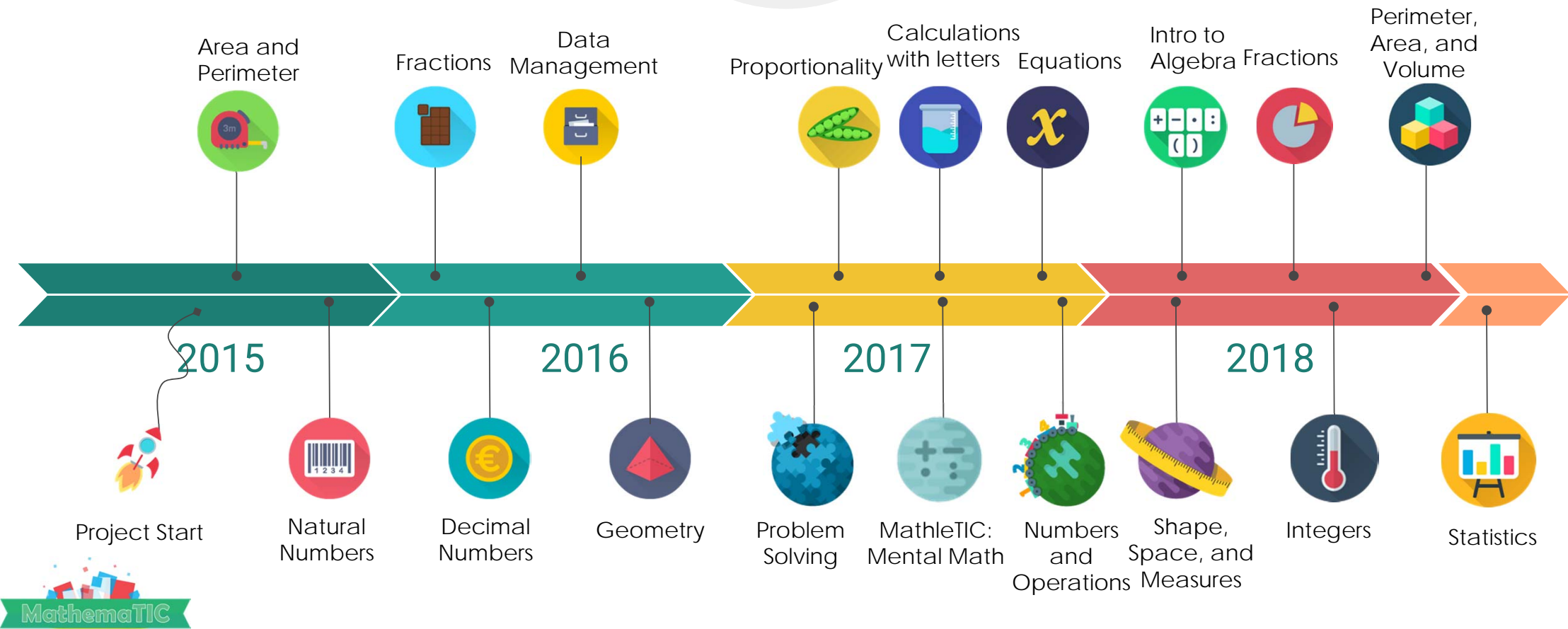
[www.mathematic.lu](http://www.mathematic.lu)



# MathemaTIC: technology-enhanced items



# 18 Modules

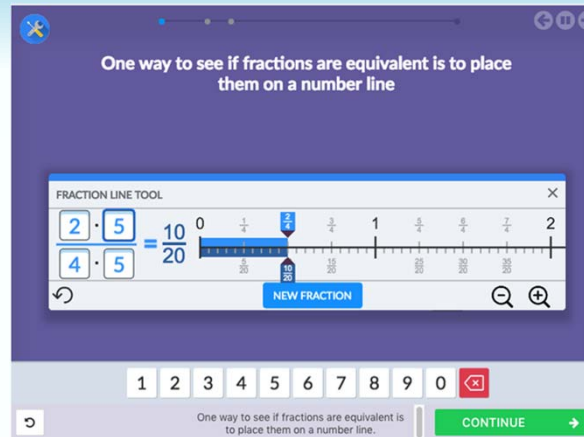


# MathemaTIC- Learning tools

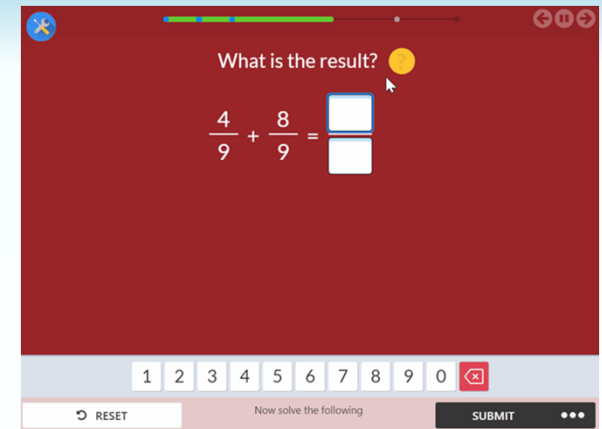
## Algebraic Terms



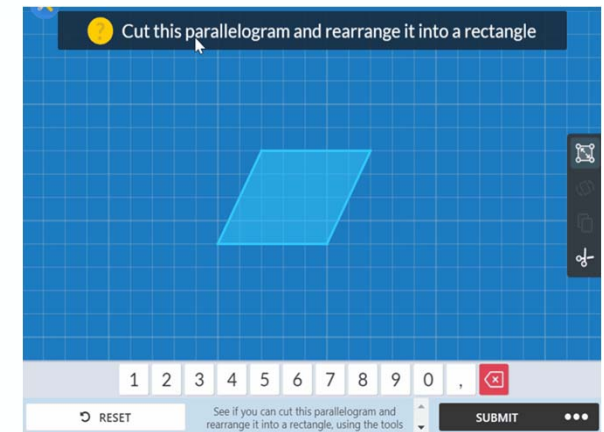
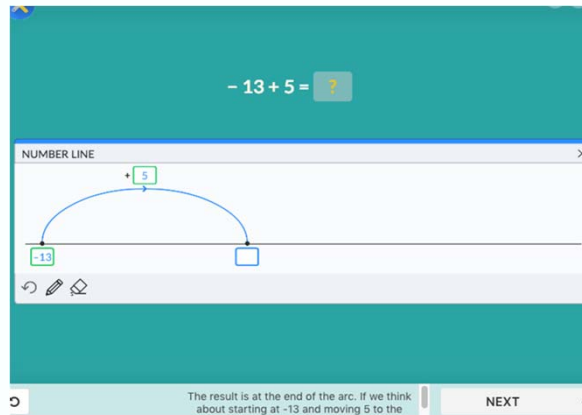
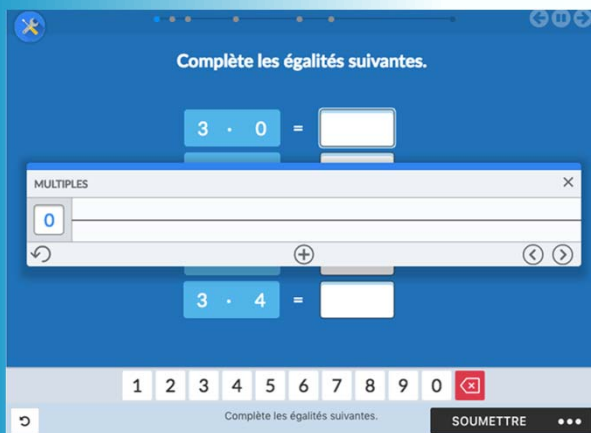
## Fraction Line Tool



## Fraction Multi-Tool

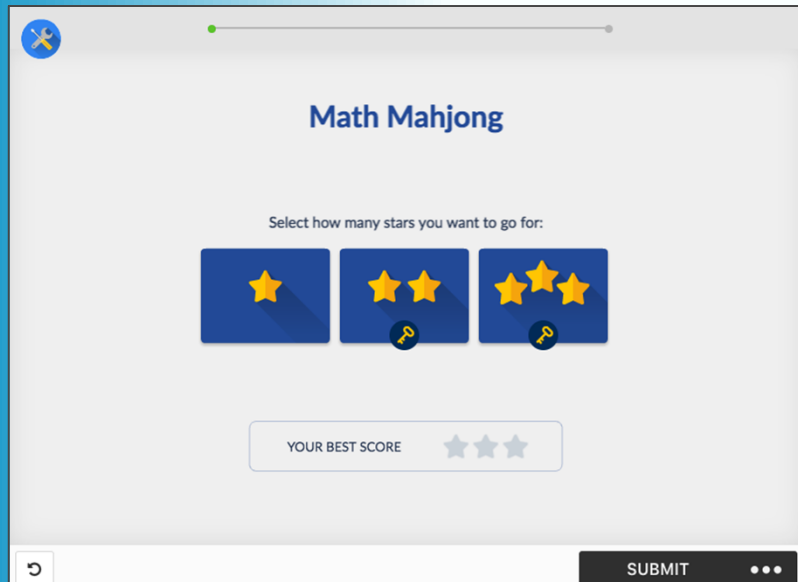


## Multiples Tool

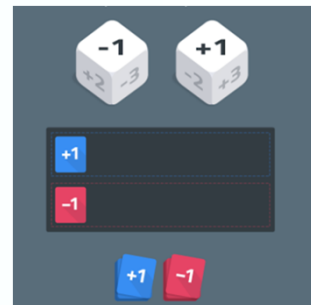
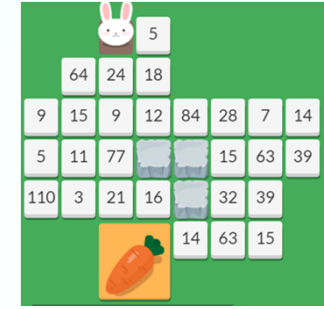
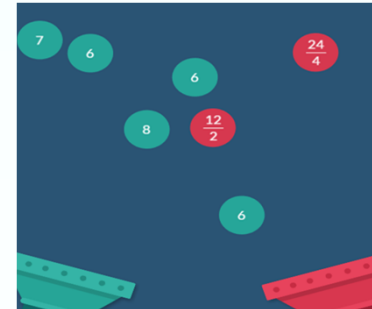
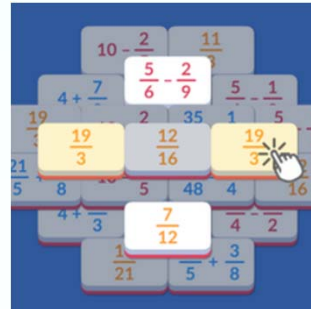




# MathemaTIC- Gamification



Difficulty Selection



Game-Like Items

# MathemaTIC- Key features in items

## Step-by-step Assistance

Write the equivalent fraction

$$\frac{3}{5} = \frac{\boxed{\phantom{000}}}{25}$$

**Assistance**

In order for the fractions to be equivalent, the numerator and denominator must be amplified by the **same value**.

$$\frac{3}{5} = \frac{3 \cdot 5}{5 \cdot 5} = \frac{?}{25}$$
$$5 \cdot \boxed{5} = 25 \quad \checkmark$$

1 2 3 4 5 6 7 8 9 0  $\times$

RESET SUBMIT

## Reference Book

**Congratulations!**

You have finished the "Order of Operations" lesson.

- 1 First do the operations inside Brackets. ( )
- 2 Multiply and divide from left to right.  $\cdot$   $:$
- 3 Add and subtract from left to right.  $+$   $-$

RESET NEXT



# TEACHER RESOURCES

Developed in 2017-2019

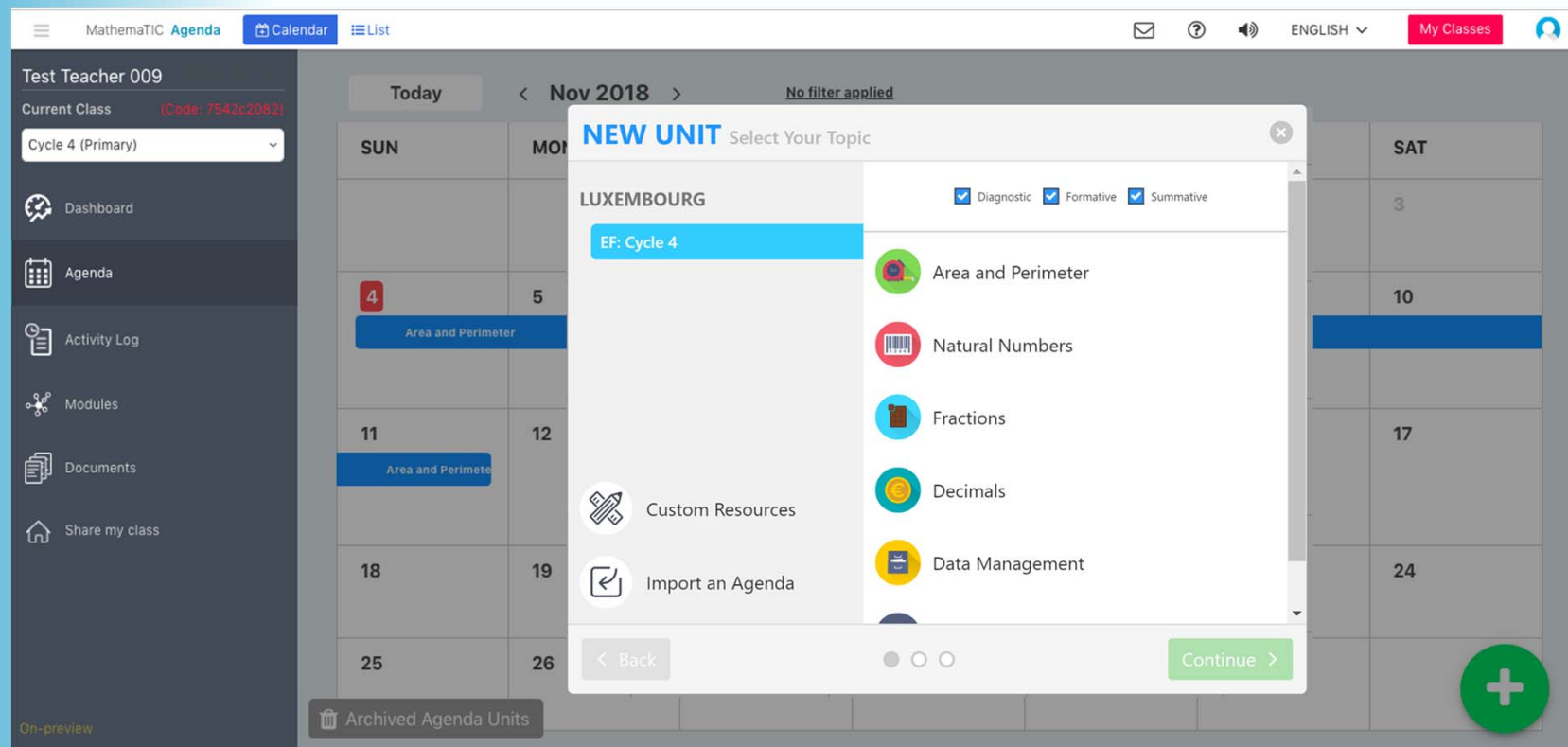


# MathemaTIC- dashboard to visualize progress

<div>Mr. Smee</div> <div>Current Class (Code: 24489c4594)</div> <div>C4 Test (No Flash)</div> <div>Dashboard</div> <div>Agenda</div> <div>Workspace</div> <div>Modules</div> <div>Documents</div> <div>Share my class</div>					Modules			
		First Name ^	Last Name ⇅	Student Report	Natural Numbers	Fractions	Decimals	Area and Perimeter
	⚙	Tester Charles	1	📄	🟢🟡🟡	🟢🟢🟢	🟢🟢🟡	🟢🟢🟡
	⚙	Tester Charles	2	📄	🟡🟡🟡	🟢🟡🟡	🟡🟡🟡	🟡🟡🟡
	⚙	Student 395	Test	📄	🟢🟡🟡	🟢🟡🟡	🟡🟡🟡	🟡🟡🟡
	⚙	Student 394	Test	📄	🟢🟡🟡	🟡🟡🟡	🟡🟡🟡	🟢🟡🟡
	⚙	Student 393	Test	📄	🟡🟡🟡	🟡🟡🟢	🟢🟡🟢	🟡🟡🟡
	⚙	Student 392	Test	📄	🟢🟡🟢	🟢🟡🟡	🟢🟡🟡	🟢🟡🟢
	⚙	Student 391	Test	📄	🟡🟡🟡	🟡🟡🟡	🟡🟡🟡	🟡🟡🟡
	⚙	Student 386	Test	📄	🟡🟡🟡	🟢🟡🟡	🟡🟡🟡	🟡🟡🟢
	⚙	Student 385	Test	📄	🟡🟡🟡	🟡🟡🟡	🟡🟡🟢	🟢🟡🟢
	⚙	Student	Grade 7 and 8	📄	🟢🟡🟡	🟡🟡🟡	🟡🟡🟡	🟢🟡🟡
	⚙	Ryan	Student	📄	🟡🟡🟡	🟡🟡🟡	🟡🟡🟡	🟡🟡🟡
	⚙	Mister	Student	📄	🟢🟢🟢	🟢🟢🟢	🟢🟢🟢	🟢🟢🟢
	⚙	Cycle	Fourster	📄	🟢🟡🟡	🟢🟢🟢	🟢🟢🟡	🟢🟢🟡



# MathemaTIC- agenda to assign lessons to overall class or individual students



# MathemaTIC- scheduling or customizing units to overall class or individual students

The screenshot displays the MathemaTIC interface. On the left is a dark sidebar with navigation links: Dashboard, Agenda (highlighted), Workspace, Modules, Leaderboard, Documents, and Share my class. The main area shows a calendar for November 2018. A 'NEW UNIT' dialog box is open, prompting 'When?' and 'Click to adjust the start and end dates'. It features 'Start' and 'End' date pickers. The 'Start' date is set to 'Tue November 2018' and the 'End' date is 'Mon November 2018'. Below these are two calendar views for November and December 2018. In the November calendar, the 6th and 12th are highlighted. At the bottom of the dialog are 'Back' and 'Continue' buttons. A green circular button with a white plus sign is located in the bottom right corner of the main interface.

Current Class (Code: 24489c4685)

Today < Nov 2018 > No filter applied

**NEW UNIT** When?

Click to adjust the start and end dates

Start: Tue November 2018 → End: Mon November 2018

November 2018: S M T W T F S  
4 5 6 7 8 9 10  
11 12 13 14 15 16 17  
18 19 20 21 22 23 24  
25 26 27 28 29 30

December 2018: S M T W T F S  
2 3 4 5 6 7 8  
9 10 11 12 13 14 15  
16 17 18 19 20 21 22  
23 24 25 26 27 28 29  
30 31

< Back ○ ● ○ Continue >

Archived Agenda Units

# MathemaTIC- activity log with detailed performance data by student and class

MathemaTIC Activity Log

Test Teacher 009

Current Class (Code: 7542c2052)

EF: Cycle 3 - Cycle 3 (Primary)

Dashboard

Agenda

Activity Log

Modules

Leaderboard

Documents

Share my class

On-preview

All students

	%	Time spent (m:s)
tester student one testerlastname		
Level 5 - Addition	100%	01:03
Level 3 - Division	100%	00:29
Level 3 - Division	100%	00:29
Level 3 - Division	100%	00:28
Level 2 - Division	100%	00:28
Test Student 035		
Diagnostic		00:29
Diagnostic		00:29
Level 1 - Addition		00:09
Moving in a maze	100%	01:38
Moving in a maze		00:19
Test Student 045		
Level 3 - Division		00:20
Level 3 - Division		00:20
Level 2 - Division	100%	00:44
Level 1 - Division	100%	00:43
Level 8 - Multiplication	50%	00:57
C3 Test		
Level 8 - Addition		00:31
Level 8 - Division	100%	00:56
Level 8 - Division	50%	00:44

EF: Cycle 3 / All modules

Space, Shape and Measures

Numbers and Operations

MathleTIC Mental Math

Problem Solving

# MathemaTIC- leaderboards

Test Teacher 009

Current Class (Code: 7942c2052)

EF: Cycle 3 - Cycle 3 (Primary)

Dashboard

Agenda

Activity Log

Modules

Leaderboard

Documents

Share my class

MathemaTIC Leaderboards

Current Leaderboards

MathleTIC June 2018

View Results

MathleTIC June 2018

View Results

MathleTIC June 2018

View Results

MathleTIC June 2018

View Results

EF: Cycle 3 - Cycle 3 (Primary)

Class Certificate

Top Total

Top Average

Refresh

Rank	Stars	Badges	Score (Total)
75	★ 74	🏆 16	9000
76	★ 67	🏆 20	8700
77	★ 64	🏆 21	8500
78	★ 62	🏆 10	7200
79	★ 47	🏆 9	5600
80 - (My Class)	★ 39	🏆 11	5000
81	★ 31	🏆 9	4000
82	★ 27	🏆 9	3600
83	★ 25	🏆 8	3300



# MathemaTIC- student reports

## Student 350 Test



Module: Integers  
Test Completed on: Fri, Oct 26, 2018 09:51  
Class of: Teacher 410 Test



Assessment Report  
Exported on Wed, Oct 31, 2018  
Page 2

No.	Question	Student Response	
4	Complete the inequality by inserting the correct sign. <i>Expected Response: <math>-23 &lt; 22</math></i>	$-23 < 22$	✓
5	Complete the inequality by inserting the correct sign. <i>Expected Response: <math>-15 &gt; -16</math></i>	$-15 > -16$	✓
6	Click on the smallest number. 9,2 ; -10,8 ; 10,01 <i>Expected Response: -10,8</i>	-10,8	✓
7	Click on the smallest number. -7,4 ; -8,8 ; 0 <i>Expected Response: -8,8</i>	-8,8	✓
8	Click on the largest number. -3,51 ; -3,52 ; 0 <i>Expected Response: 0</i>	0	✓
9	Order the numbers below from smallest to largest. <i>Expected Response: <math>-17 &lt; -13 &lt; -5 &lt; -2 &lt; 2 &lt; 14</math></i>	$-17 < -13 < -5 < -2 < 2 < 14$	✓
10	Order the numbers below from smallest to largest. <i>Expected Response: <math>-5,3 &lt; -5,2 &lt; -5 &lt; -4,7 &lt; 0,7 &lt; 2,1</math></i>	$-5,3 < -5,2 < -5 < -4,7 < 0,7 < 2,1$	✓
11	$-5,6 + 2$ is equal to... <i>Expected Response: -3,6</i>	-3,6	✓
12	$-1,8 + 3,8$ is equal to... <i>Expected Response: 2</i>	2	✓

## Student 350 Test



Module: Integers  
Test Completed on: Fri, Oct 26, 2018 09:51  
Class of: Teacher 410 Test



Assessment Report  
Exported on Wed, Oct 31, 2018  
Page 1

QUESTIONS CORRECT  
20/22

QUESTIONS SKIPPED  
0

TIME SPENT  
08:20  
(min: sec.)

### RESPONSES ON THE ASSESSMENT

No.	Question	Student Response	
1	Click on the statement that is false. <i>Expected Response: The point A has a value of -6</i>	The point A has a value of -6	✓
2	Place these points on the number line: <i>Expected Response:</i> A → -11 B → 8 C → -12 D → -6 E → 4 F → 9 G → -13 H → -1	A → -2 B → -4 C → -3 D → -1 E → 0 F → 1 G → 2 H → 3	✗
3	Place these points on the number line: <i>Expected Response:</i> A → 1,7 B → 1,5 C → 1,2 D → 0,7 E → -0,5 F → -0,9 G → -0,1 H → 0,3	A → -0,9 B → -0,7 C → -0,8 D → -0,5 E → -0,6 F → -0,3 G → -0,4 H → -0,2	✗

# MathemaTIC- sharing agenda

The screenshot displays the MathemaTIC Agenda interface. On the left, a sidebar contains navigation links: Dashboard, Agenda (highlighted), Activity Log, Modules, Documents, and Share my class. The main area shows a calendar for April 2018. A context menu is open over the calendar, offering options: Edit, View report, Share Agenda, and Archive. The calendar grid shows dates from Sunday to Saturday. Agenda items are represented by blue bars with icons and labels: 'testingunlock' on Sunday 8, 'unlocktest' on Monday 9, 'test444' on Monday 16, 'Proportionality' on Thursday 19, and 'Archived Agenda Units' on Friday 20. A green circular button with a white plus sign is located in the bottom right corner of the calendar grid.

MathemaTIC Agenda | Calendar | List

Test Teacher 009  
Current Class (Code: 7542c2053)  
Secondary School

Dashboard  
Agenda  
Activity Log  
Modules  
Documents  
Share my class

On-preview

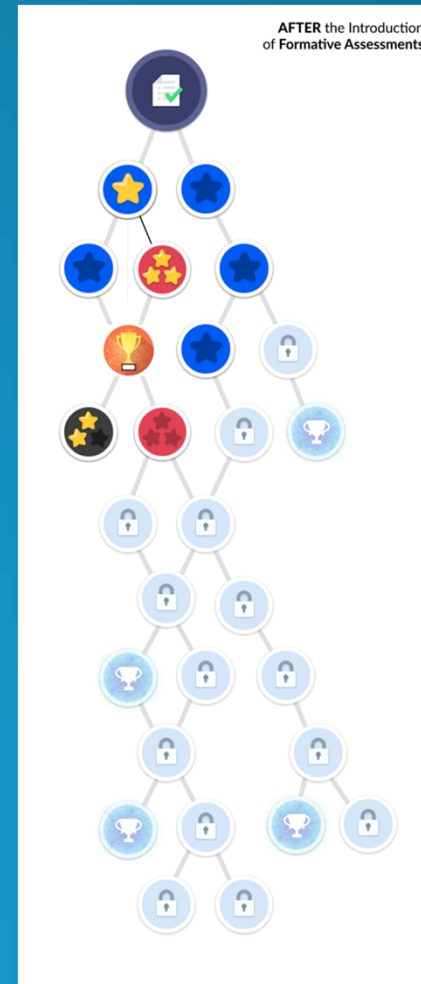
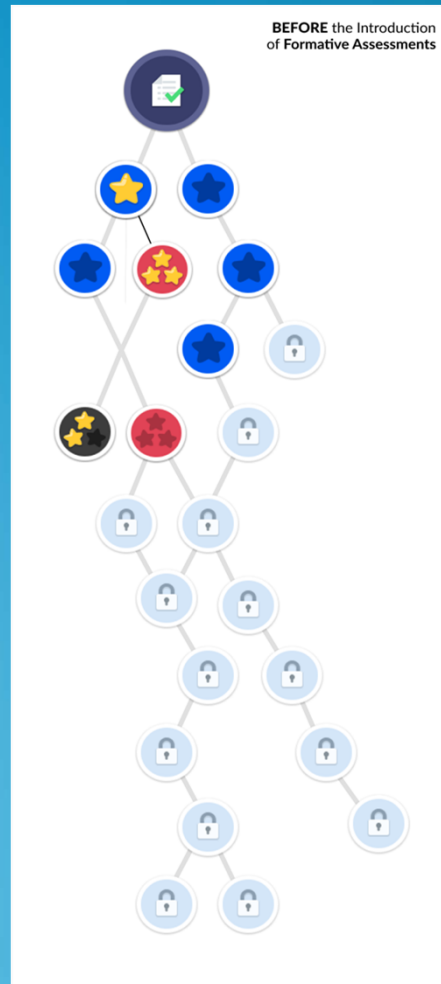
Today < Apr 2018 > No filter applied

SUN	MON	TUE	WED	THU	FRI	SAT
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28

Agenda items:

- testingunlock (Sunday 8)
- unlocktest (Monday 9)
- test444 (Monday 16)
- Proportionality (Thursday 19)
- Proportionality (Friday 20)
- Proportionality (Friday 20)
- Proportionality (Friday 20)
- Archived Agenda Units (Friday 20)

# MathemaTIC- formative mini-assessments



# MathemaTIC – in a collaborative partnership



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Researchers



SCRIPT

Service de Coordination de la Recherche  
et de l'innovation pédagogiques et technologiques



UNIVERSITÉ DU  
LUXEMBOURG

LUCET | LUXEMBOURG CENTRE  
FOR EDUCATIONAL TESTING

Teachers, IT and  
curriculum specialists



DEPP

Technology learning architects



Vretta





# MathemaTIC: teacher development

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## ■ PLC for MathemaTIC

- online interactive tool
- tailored to teacher needs
- 20% of schools
- 90' of team work per month
- shared practice and reflection

**Professional learning community**

# MathemaTIC: research on User eXperience

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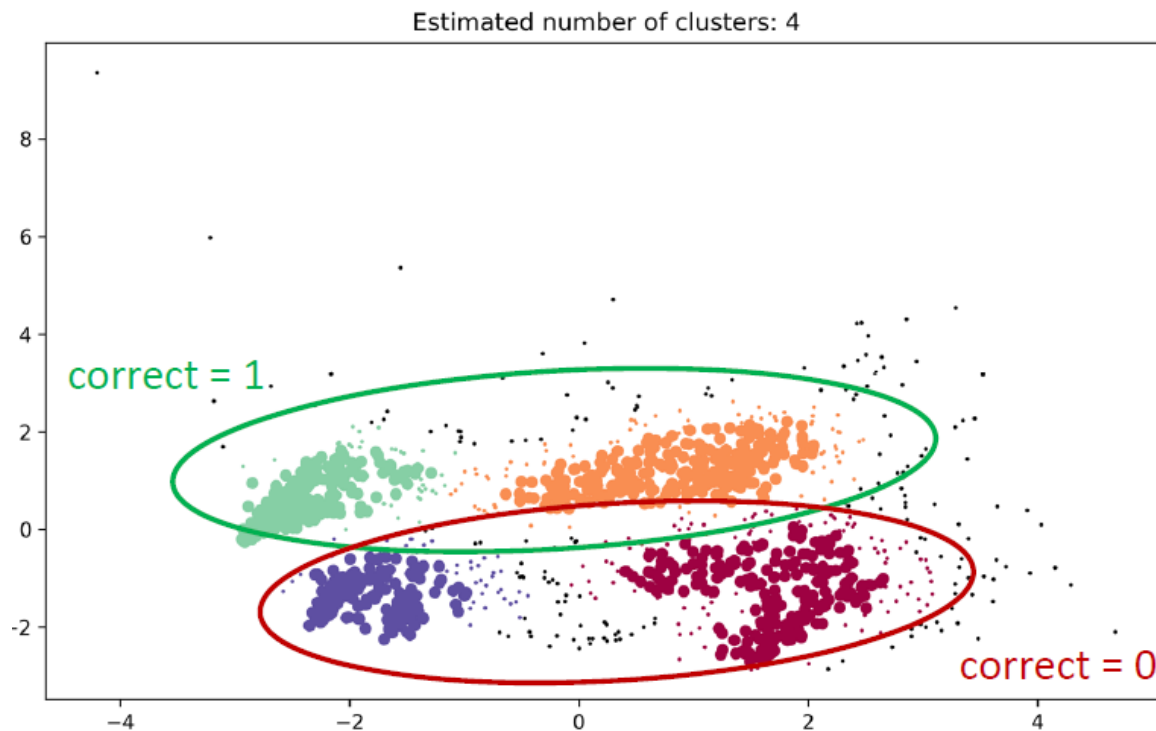


## UX & MathemaTIC

- perception of usability
- video-taping of classroom
- 360 view of interaction
- eye-tracker to capture emotions
- field observation

## Assessment MicroAnalytics

# MathemaTIC: big data & learning



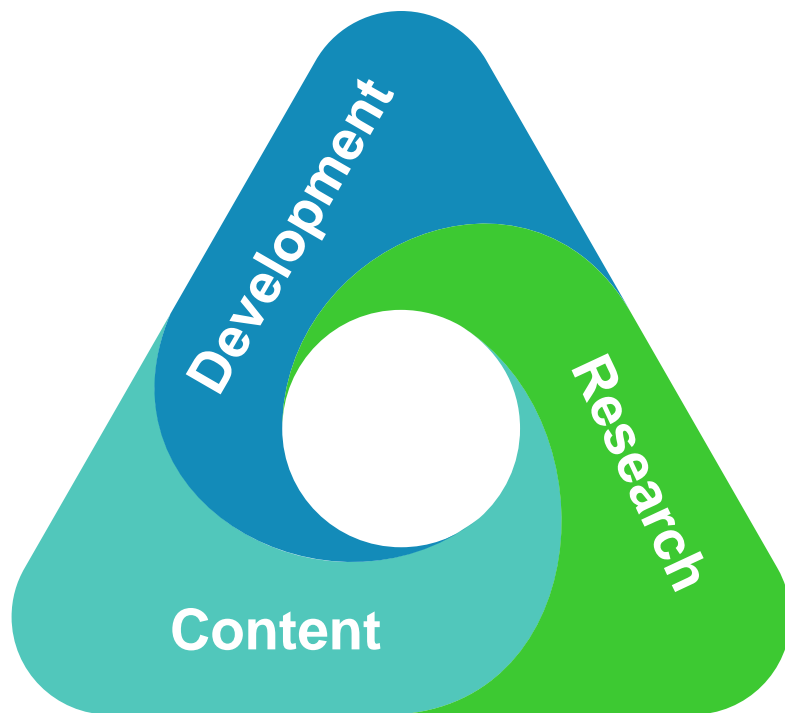
## Patterns in problem-solving







## Learning strategies in MathemaTIC

- use data from an online formative assessment
- examine item from a didactical point of view
- use data to illustrate possible paths for solving problem
- identify patterns in strategies applied by students
- provide data reports to teachers

# MathemaTIC – sharing in FLIP

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-  **Sharing in FLIP+**
-  access to items
  -  sharing further development
  -  conversion to PCI
  -  professional development and research
  -  bilateral conventions

**Sharing content, adaptation of items and research**



## GET IN TOUCH



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SCRIPT

Service de Coordination de la Recherche  
et de l'Innovation pédagogiques et technologiques

# THANK YOU!



website  
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