

Conference Programme MATHS COUNTS 2018

11th & 12th May

“ A dynamic conference for all mathematics teachers. Showcasing the work of hundreds of teachers participating in *Lesson Study*.



O'Brien Centre for Science,
UCD



? For more details visit projectmaths.ie

Free Registration. Book now:
www.projectmaths.ie/mc2018

Refreshments, lunch and resource packs
for all participants.

INTERACTIVE WORKSHOPS

Choose from 18 Interactive Workshops led by teachers engaged in *Lesson Study*.

LIVE LESSONS

Observe exemplar *Structured Problem Solving Lessons* being Taught to students live at *Maths counts 2018*.

INTERNATIONAL EXPERT

The Keynote Speaker Professor Tad Watanabe wowed teachers at *Maths Counts 2013*. He returns to teach 5th Year students from Ardee Community School.





Ciara O'Donnell
National Director

Welcome

A chairde

I am delighted to welcome you all to the fifth year of *Maths Counts* brought to you by the Maths Development Team of the Professional Development Service for Teachers (PDST). The PDST is a cross sectoral support service providing a range of professional development opportunities to teachers and school leaders in all aspects of teaching, learning and assessment. The PDST is delighted to embrace the work of the Maths Development Team in the area of *Lesson Study*, an internationally recognised model of professional development which captures and promotes individual, teacher and school collaborative planning, observation and analytic reflection on classroom practices and student engagement through structured problem solving lessons.

In 2014 the (Project) Maths Development Team introduced Japanese *Lesson Study* nationally to post-primary maths teachers. Since then participation in *Lesson Study* has grown to over 150 schools indicating the appetite amongst Irish schools to adopt this worthwhile and innovative programme. This conference will further illuminate *Lesson Study* through live structured problem solving lessons to students focusing on various topics at Junior and Senior Cycle. During these lessons you will see teachers conducting a lesson observation followed by post-lesson discussion with a "knowledgeable other", thus showcasing how the *Lesson Study* cycle plays out and unfolds. Furthermore the poster displays representing 70 Research Lessons taught throughout the country in the last year, involving 450 teachers from over 150 post-primary schools, will provide great insights into this work including full details of the research lesson and the reflection on that learning. It is also intended that the conference will provide a unique opportunity for participants to meet with other teachers and learn about the art of teaching through structured problem solving. It is truly wonderful to welcome back Professor Tad Watanabe following his inspirational contribution four years ago. This conference will be most enriched by the wisdom and insights he brings to the *Lesson Study* process and problem solving within the teaching and learning of mathematics.

The recently-published report STEM Education in the Irish School System locates mathematics as a foundation stone and vital entry point to other STEM disciplines. The teaching of mathematics lends itself to unlocking learning in skills that are becoming increasingly vital for today's society. Lateral divergent thinkers with advanced problem-solving and reasoning abilities are in demand in a world which values real understanding over 'quick-fix' answers and the ability to identify multiple solutions to a problem. *Lesson Study* effectively promotes such skills and supports teachers in developing them through the use of structured problem solving strategies. As a form of professional development for the practitioner, it allows for a contextualised and collaborative approach which takes place over a series of lessons and reflective conversations. The provision of that professional development requires a committed team. To that end I want to extend a particular word of thanks to the PDST Maths Development Team, Dr. Anne Brosnan, Dr. Stephen Gammell, Aidan Roche and our team of 45 Associates and 13 Local Facilitators who, in continually working with schools, have been instrumental in promoting the *Lesson Study* model as well as co-ordinating this annual event. I would also like to acknowledge the administration staff, Gráinne Haughney and Rachel Whearity in Drumcondra Education Centre, for their tireless work in making *Maths Counts* run smoothly every year.

Finally a special word of thanks to the schools and teachers who have willingly participated in *Lesson Study*. Thanks also to those who have generously agreed to share and demonstrate their experiences through the poster presentations and interactive workshops. This conference is about acknowledging and celebrating the commitment of these teachers to their own learning, ultimately undertaken in the best interests of their students. Wishing you all a wonderful two days of learning, sharing and connecting as professionals! Guím gach rath ar an obair.

Le dea-ghu


Ciara O'Donnell
National Director

Professional Development Service for Teachers

Professor Tad Watanabe



Tad Watanabe is a Professor of Mathematics Education and Assistant Department Chair in the Department of Mathematics at Kennesaw State University, Kennesaw, Georgia. He received his Ph.D. in mathematics education from Florida State University and MS in mathematics from Purdue University. As a native of Japan, Tad was always interested in mathematics education practices in Japan such as *Lesson Study* and teaching through problem solving. Since 2000, he has attended numerous research lessons in Japan, both at primary and secondary levels. He has written several articles on *Lesson Study* as well as Japanese elementary school mathematics curriculum materials.

He has worked with a number of *Lesson Study* groups in the United States, including the groups in Volusia County, FL, Oakland, CA, San Francisco, CA, and Chicago, IL. He is also one of the leaders of the *Lesson Study* Immersion Program organized by Tokyo Gakugei University every summer.

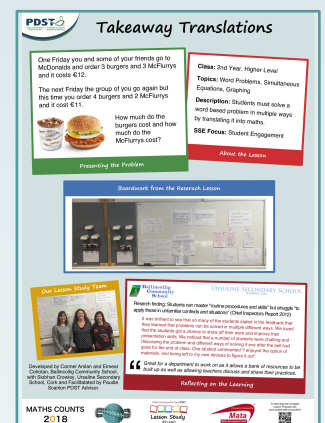
Professor Watanabe attended the first Maths Counts Conference in 2013 where he wowed teachers with his approach to teaching geometry using open-ended problems. This year, Tad will teach a group of fifth-year students from Ardee Community School live at the conference and give a keynote address on the international impact of *Lesson Study* on professional development in mathematics education.

Live Research Lessons, Interactive Workshops and *Lesson Study* Poster Exhibition

Maths Counts 2018 will again showcase three live lessons developed through our *Lesson Study* programme. The lessons will be taught to a group of students from the research team's own school in front of conference attendees and a lesson observation and post-lesson discussion will also take place.

We've chosen 24 lessons to showcase as interactive workshops where you'll get the chance to hear teachers describe their experience of designing their problem-solving lesson, how the teaching of the lesson went, what they learned about students' understanding of maths and how they feel about teaching maths through problem solving. The 24 workshops are divided into three time slots with 8 workshops happening simultaneously during each slot. Check out the poster exhibition to see which workshops you'd most like to attend.

To celebrate the huge amount of work carried out by teachers in their schools, posters summarising the key points of each lesson proposal and the research findings of each group have been printed. The posters will be on display in the foyer of The O'Brien Building throughout Maths Counts. You may want to check them out so that you can choose which live lesson and which interactive workshops you'd like to attend. You'll also get loads of great ideas for teaching mathematics.



Shane Flanagan, JCT Team Leader



Shane is the Team Leader for Mathematics with the Junior Cycle for Teachers Support Service. Shane will present on Mathematics in the context of Junior Cycle reform and the Framework for Junior Cycle (2015). The structure of the Mathematics specification will be outlined, and its role in further engaging our students in higher order mathematical thinking and problem solving will be considered.



Educational Resources

We'll have a wide range of education suppliers in attendance at the conference. Come along and find out about the latest resources for teaching and learning, pick up some sample materials and learn about the exciting developments which are planned for supporting teachers in their work.

Win the latest SurfacePro and accessories with thanks to Microsoft Ireland



Live Lessons at Maths Counts 2018

After breaking new ground with our live problem solving lessons by Irish teachers in 2017, Maths Counts 2018 will again showcase three live lessons developed through our *Lesson Study* programme. The lessons will be taught to a group of students from the research team's own school in front of conference attendees and a lesson observation and post-lesson discussion will also take place.

Live Lesson: Plane Clothes



Pat O'Leary, Eimear White, Celine Buckley and Declan Cronin, from Coláiste na Toirbhirte, Bandon Co. Cork have designed a lesson to encourage students to be flexible in their thinking, specifically in the area of geometry. They hope that the "area" problem they have created will help students recognise the benefits of applying algebra, in the form of coordinate geometry, to geometric problems and that students will also identify the benefits of using surds when dealing with irrational numbers. Eimear will teach the lesson to a group of her higher-level second years while

Pat, Celine and Declan will observe students' learning.

Live Lesson: Heavenly Slopes

Emer Hickey and David Walton from Coláiste Éamann Rís, Callan, Co. Kilkenny and Aoife Cronin from Holy Family Secondary School, Newbridge, Co. Kildare have collaborated across schools to design a lesson which aims to help students develop a deep understanding of the slopes of parallel and perpendicular lines. They hope that the problem they have chosen will challenge students to apply their prior knowledge to forge new links between geometry and coordinate geometry and that in the process of doing so they will discover the relationship between the slopes of parallel lines and perpendicular lines. David will teach the lesson to a group of his third-year students while Emer and Aoife will participate in the live post-lesson discussion.



Live Lesson: Untangle the Angles

Brigid Ring, Aishling Donohue and Lauren Matthews, from Ardee Community School, Co. Louth, have designed a lesson which focuses on encouraging students to use prior knowledge, in the form of axioms, theorems and constructions to



to identify a number of new geometric relationships. They hope that this lesson will provide students with an introduction to the type of reasoning needed when dealing with geometry problems and that this will form a solid foundation for being able to prove various relationships at a later stage. Lauren will teach the lesson to a group of her first-year students while Brigid and Aishling will observe students' learning and participate in the discussion after the lesson.

Schools in our *Lesson Study* Programme 2017-2018



Maths Development Team PDST

Abbey Vocational School, Donegal
Ardee Community School
Ardscoil Na Mara, Tramore
Ardscoil na Tríonoide, Athy
Ballinamore Community School
Ballincollig Community School
Ballinodde Community College
Ballyfermot College of Further Education
Ballymakenny College
Beech Hill College, Monaghan
Beneavin De La Salle College
Boherbue Comprehensive School
Borris Vocational School, Borris
Borrisokane Community College
Carndonagh Community School
Carrick on Shannon CS
Carrigallen Vocational School
Cashel Community School
Castleknock College
Castletroy College
CBS Nenagh
CBS Roscommon
Chanel College
Christ the King Secondary School
CBS Kilkenny
Clarín College, Athenry
Clifden Community College
Clonturk Community College, Whitehall
Coláiste An Chroí Naofa, Carrignavar
Colaiste Bhaile Chlair, Claregalway
Coláiste Bríde, Enniscorthy
Coláiste Chiarain
Coláiste Chill Mhantain
Coláiste Choilm, Ballincollig
Coláiste Éamann Rís, Callan
Coláiste Eamonn Rís, Wexford
Coláiste Iognáid, Galway
Coláiste Mhuire, Askeaton
Coláiste Mhuire, Ennis
Coláiste Mhuire, Johnstown
Coláiste na Toirbhirte
Coláiste na Trócaire, Rathkeale
Coláiste Naomh Éinne
Coláiste Naomh Eoin
Colaiste Pobail Acla
Coláiste Pobail Setanta, Clonee
Coláiste Rís, Dundalk
Columba's Comprehensive School
Coolmine Community School
Crána College
Cross & Passion College

Davis College, Mallow
De La Salle Churchtown
De La Salle College, Dundalk
Deansrath Community College
Deele College
Deerpark CBS
Desmond College, Limerick
Dominican College Cabra
Donabate Community College
Drogheda Grammar School
Enniscorthy Vocational College
Gaelcholáiste Charraig Uí Leighin
Gallen Community School
Glenart College
Gorey Community School
Grange Community College
Grange Post Primary
Hansfield Educate Together SS
Hartstown Community School
Holy Child SS, Killiney
Holy Family CS, Rathcoole
Holy Family SS, Newbridge
John Scottus
Killarney Youthreach
Kilrush Community School
Laurel Hill Coláiste
Loreto Community School, Milford
Lusk Community College
Malahide CS, Malahide
Manor House College
Marian College
Mary Immaculate SS, Lisdoonvarna
Maynooth Education Campus
Mercy SS, Ballymahon
Mohill Community College
Mount Sackville SS, Chapelizod
Mount Temple Comprehensive School
Mountmellick Community School
Nenagh CBS
Old Bawn Community School
Patrician Presentation SS, Fethard
Pobail Scoil Inbhear Sceine
Presentation College, Tralee
Presentation SS, Warrenmount
Ratoath College
Regina Mundi College
Rice College, Ennis
Rockford Manor, Blackrock
Salesian College, Pallaskenry
Sandford Park School, Ranelagh
Schull Community College
Scoil Chríost Rí, Portlaoise

Scoil na mBráithre, Charleville
Scoil Phobail Sliabh Luachra
Scoil Ruain, Killenaule
Scoil Uí Mhuiri, Dunleer
Seamount College
Skibbereen CS, Skibbereen
St Aidan's CS, Cootehill
St Caimin's College, Shannon
St Colemans CS, Middleton
St Declan's College, Cabra
St John Bosco CC, Kildysart
St Josephs CBS, Nenagh
St Joseph's CC, Charlestown
St Leo's College, Carlow
St Louis CS, Kiltimagh
St Marks CS, Tallaght
St Mary's SS, Ballina
St Marys College, Knockbeg
St Mary's SS, Charleville
St. Aidan's CBS, Whitehall
St. Aloysius Girls SS
St. Anne's CS, Killaloe
St. Caimin's CS, Shannon
St. Ciaran CS, Kells
St. Declan's CC, Kilmacthomas
St. Fanahan's, Mallow
St. Farnan's Post Primary
St. Fergal's College, Rathdowney
St. Mary's College, Dundalk
St. Mary's Holy Faith, Glasnevin
St. Mary's Academy, Carlow
St. Mary's College, Galway
St. Mary's College, Rathmines
St. Micheal's College, Listowell
St. Patrick's College, Kilalla
St. Wolstan's CS, Celbridge
Tallaght CS, Tallaght
Templemichael College
Templeogue College
Terence MacSwiney CC, Hollyhill
The Abbey School, Tipperary
Thomond CC
Ursaline Secondary School Cork
Virginia College, Virginia
VTOS Tullamore
Woodbrook College
Wilson Hospital School
Our Lady's Drogheda
Glenart College, Arklow
Jesus and Mary SS, Enniscrone
Portlaoise College
St. Joseph's CC, Kilkea

A003

13:30
–
14:05

It's a Matter of Principles
5th Year HL
Differential Calculus

A004

Balancing Act
2nd Year OL
Simultaneous Equations

A005

The Formula Speaks Volumes
2nd Year HL
Area and Volume

A006

When Area is 64
2nd Year CL
Area & Functions

A007

Paving Patterns
3rd Year HL
Linear Relationships

A008

Meet you Halfway
2nd Year CL
Coordinate Geometry

B006

Percentage Predicament
2nd Year CL
Percentages

B110

Fun with Games
2nd Year HL
Relations & Algebra

14:15
–
14:50

The Pyramid Problem
5th Year HL
3D Trigonometry

Pump up the Volume
2nd Year OL
Area & Volume

The Grand Rational
5th Year HL
Rational Functions

Who gets the money?
3rd Year HL
V.A.T.

Count like an Egyptian
2nd Year CL
Algebra

Mary's Money
2nd Year HL
Algebraic Fractions

2D or not 2D
2nd Year HL
Area & Volume

The Treasure Hunt
3rd Year HL
Trigonometry

15:00
–
15:35

Are Circles Pointless?
5th Year HL
Equation of a Circle

It's Thirsty Work
2nd Year CL
Rate of Change & Graphs

Sharing the Unknown
2nd Year HL
Algebraic Fractions

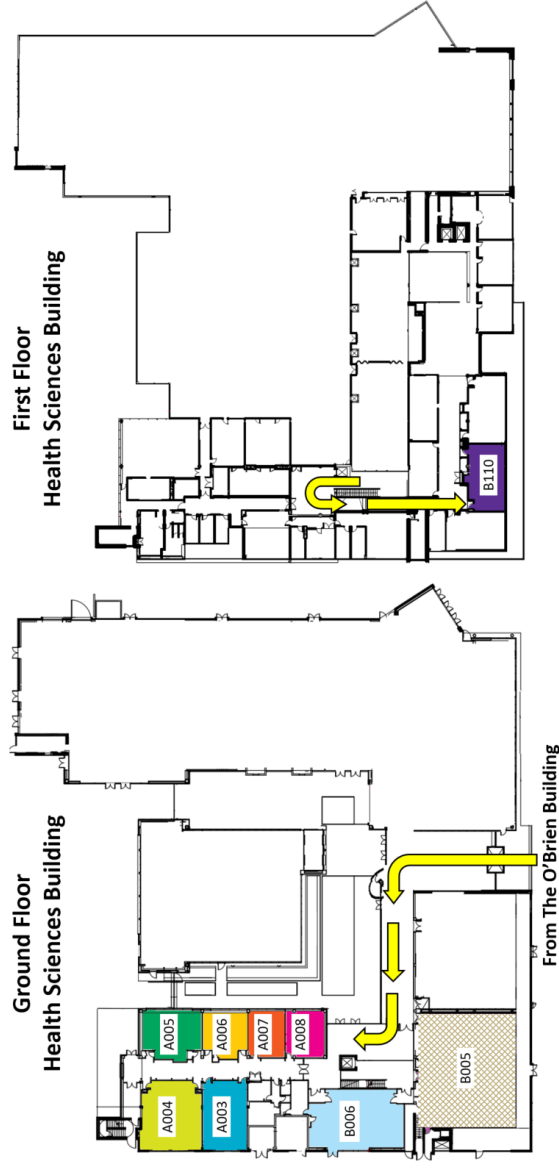
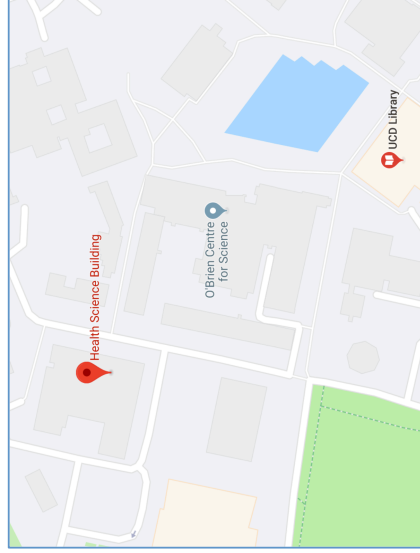
Make up Money
3rd Year HL
Linear Relationships

Box Bonanza
1st Year CL
Linear Patterns

Monkey Puzzle
1st Year CL
Fractions

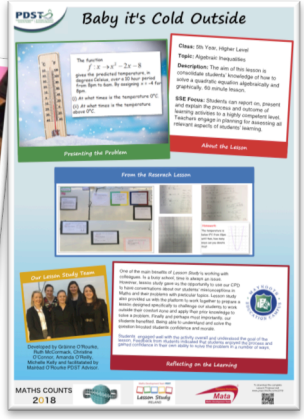
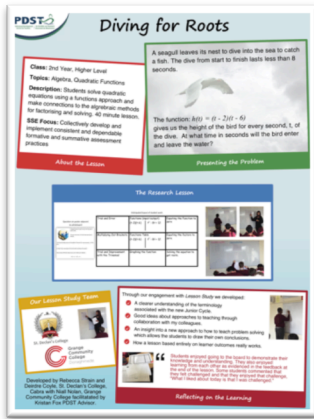
Value for Money
2nd Year CL
Currency Exchange

It's Moore of a Process
5th Year HL
Exponential Functions



Interactive Workshop Timetable

Venue: Health Sciences Centre



Frequently Asked Questions

1. Who is the conference for?

It is a national conference for all post-primary, newly-qualified and prospective maths teachers and those interested in *Lesson Study* and in maths education in general.

2. Who is organising it?

The conference is being organised by The Maths Development Team from PDST.

3. Do I have to attend on Friday and Saturday?

You can attend on Friday evening only, on Saturday only or on both days. It's your choice.

4. How much does the conference cost?

Maths Counts 2018 is **FREE** to attend **but you have to register**.

5. How do I register?

Register online via www.projectmaths.ie/mc2018

Please note: Places are limited, and meals have to be booked in advance, so **if you register but then cannot attend please let us know** so we can free up your place for somebody else (email grainnehaughneymdt@pdst.ie).

6. Do I need to choose which Live Lessons and Workshops I attend in advance?

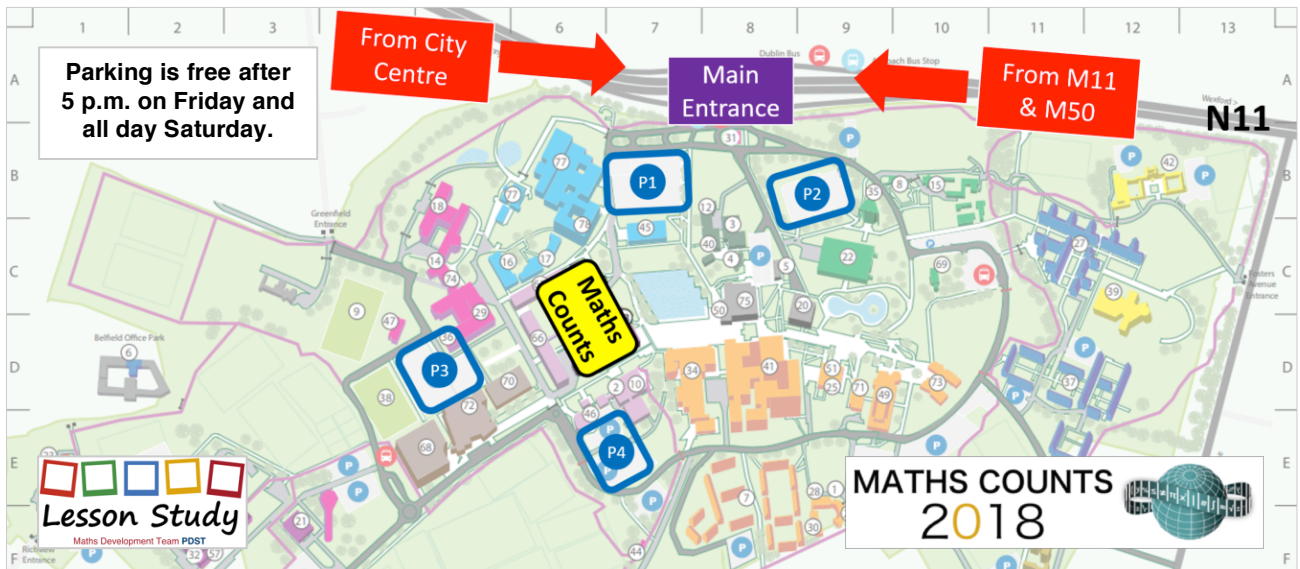
No – you can decide all this at the conference. We've provided a brief description of each Live Lesson in this programme. When you arrive at the conference you might look through the poster exhibition and decide which workshops you'd like to attend.

7. Who should I contact with further queries?

You can email our Administrator Gráinne Haughney (grainnehaughneymdt@pdst.ie) or Rachel Whearity (rachelwhearitymdt@pdst.ie) or phone (01) 8576428.

8. How do I get there?

Maths Counts 2018 takes place in **The O'Brien Centre for Science at UCD**, Belfield, Dublin 4. The UCD campus is located just off the N11/Stillorgan Dual Carriageway. The campus is served by several bus routes and Sydney Parade Dart station is a 25 minute walk away. If you are travelling by car it is advised to use car park 1 (see map). The O'Brien Centre is a two minute walk from this car park. There are also three other car parks within walking distance.



Conference Schedule

Friday

- 18:00 - 18:30 Registration - O'Brien Centre
- 18:45 - 19:15 Welcome by Ciara O'Donnell, PDST National Director
- 19:30 - 20:30 Live Lesson by Tad Watanabe
- 20:30 - 21:00 Keynote Address Tad Watanabe
- 21:00 - 22:00 Poster Exhibition and Wine Reception

Saturday

- 08:45 - 09:05 Registration
- 09:15 - 09:30 Welcome
- 09:30 - 10:30 Live Lesson by Tad Watanabe
- 10:40 - 11:10 Poster Exhibition and Coffee
- 11:10 - 12:30 Live Lessons by Irish Maths teachers
- 12:30 - 13:30 Lunch
- 13:30 - 14:05 Workshops Session 1
- 14:15 - 14:50 Workshops Session 2 Health Sciences Centre
- 15:00 - 15:35 Workshops Session 3
- 15:45 - 16:15 Presentation by Shane Flanagan, JCT Maths
- 16:15 - 16:20 Close of Conference



Dr. Anne Brosnan
National Coordinator
Maths Development Team PDST

On behalf of the Math Development Team I would like to thank all the teachers who attended this year's Maths Counts and all those teachers who participated in our *Lesson Study* programme throughout 2017-2018. When we began our *Lesson Study* journey five years ago it was hard to imagine that the programme would grow to be so successful and that Maths Counts would become an annual event where teachers teach in front of their colleagues and share their experiences of teaching mathematics through problem solving. This success is reflected by the fact that, for the past two years, demand for places at Maths Counts has exceed supply and is a credit to the ongoing work being lead at local level by our *Lesson Study* teachers, Local Facilitators and Associates. In 2017-2018 we had record engagement with Lesson Study, with 400 maths teachers from 150 schools across Ireland collaborating in the design, teaching of and

reflection on problem-solving lessons. In another first, this year's teachers used *Lesson Study* to incorporate School Improvement priorities, Junior and Senior Cycle key skills and Junior Cycle Statements of Learning into their lessons. In doing so they demonstrated the power of *Lesson Study* for supporting teachers in leading curricular reform themselves at school level. All of this amazing work is available to us all to use via our ever expanding *Lesson Study* library on www.projectmaths.ie. A final word of thanks to all Principals and Deputy Principals who supported all of us throughout the year and TES for funding this initiative.

MATHS COUNTS 2018

May 11th and 12th , O'Brien Centre, UCD

