Maths Hubs Programme Network Collaborative Projects – 2018/19

This document provides full details of the Network Collaborative Projects (NCP) planned for the Maths Hubs Programme in 2018/19. The table below provides an overview of the NCPs (codes and titles) and then the pages that follow give details about each NCP. The document aims to provide enough information for Maths Hubs to complete their 2018/19 Action Plans, however if there any questions about particular NCPs, please e-mail mathshubs@ncetm.org.uk. A further document "NCPs 2018/19 - Questions and Answers" will be updated regularly with all answers.

Code	Title
NCP1801	Primary Mastery Specialists Programme – Cohort 4
NCP18-02	China-England Exchange 2018-19
NCP18-03a	Secondary Mastery Specialists Programme – Cohort 2
NCP18-03b	Secondary Mastery Specialists Programme – Cohort 3
NCP18-04	NCETM Accredited PD Lead Programmes
NCP18-05	Maths SLE School Improvement Support Networks
NCP18-06	LLME Support Network
NCP18-07	Early Years Work Groups
NCP18-08	Primary TfM Work Groups (2018/19)
NCP18-09	Sustaining (2017/18) Primary TfM Work Groups
NCP18-10	Mastery Readiness
NCP18-11a	Primary TfM Focused Issue (Lesson Design inc. use of PD Materials and Text Books)
NCP18-11b	Primary TfM Focused Issue (Intervention in a Mastery context)
NCP18-11c	Primary TfM Focused Issue (Planning for greater depth)
NCP18-12	Secondary TfM Work Groups (2018/19)
NCP18-13	Mathematical thinking for GCSE
NCP18-14	Y5-Y8 continuity
NCP18-15	Challenging topics at GCSE
NCP18-16	Supporting Post-16 GCSE Resit
NCP18-17	Supporting Core Maths
NCP18-18	Embedding A-level Technology
NCP18-19	Developing A-level Teaching
NCP18-20	Primary SKE
NCP18-21	Teaching Assistant SKE
NCP18-22	Developing working partnership with ITT providers
NCP18-23	Developing working partnership for SEND and mathematics

Maths Hubs Programme Strategic Priorities 2018/19

(Please note that the priorities received final Ministerial approval recently and this has resulted in a different sequence and numbering.)

1. Embed the teaching for mastery approach in primary schools so that pupils develop the deep knowledge and understanding they need to be fully prepared for the secondary mathematics curriculum.

2. Develop mastery teaching in secondary schools, while also supporting schools and colleges to address the immediate challenge of teaching the 9-1 GCSE.

3. Ensure that Maths Hubs support schools and colleges effectively in areas of greatest need including Opportunity Areas, areas of deprivation and poor academic performance.

4. Develop the supply and effective deployment of local leaders of maths education.

5. Develop the knowledge and practice of Early Years Foundation Stage practitioners, to ensure that all pupils develop a secure foundation in mathematics so that they are ready for mastery teaching in Key Stage 1.

6. Work in close partnership with the Level 3 Maths Support Programme to ensure that schools and colleges receive effective support for increasing participation and improving teaching of Core Maths and AS/A-level Maths and Further Maths.

7. Work with Initial Teacher Training (ITT) and Subject Knowledge Enhancement (SKE) providers to support the effective recruitment, preparation and development of all teachers of mathematics.

(March 2018)

Title	Primary Mastery Specialists Programme – Cohort 4		
Phase	Primary	**Strategic priority**	(1) Embedding teaching for mastery in primary schools.
Stage	Scaling Up	**Project code**	**NCP18-01**

A. Programme summary

The Mastery Specialist Programme is now in its fourth year. Each year 140+ teachers are recruited by the Maths Hubs through a rigorous application process. The programme is aimed at developing the necessary skills and expertise for participants to be awarded the status of Primary Mastery Specialist. It is also expected that the Mastery's Specialist school becomes a leading exponent of teaching for mastery in this time. The core training is delivered through three residential events across an academic year. In subsequent years the Specialist is expected to work with 6/7 other schools per year to develop teaching for mastery.

B. Programme rationale

To develop high quality Mastery Specialist Teachers with the necessary skills and expertise to embed teaching for mastery in their own schools and support the development of other schools. The programme is central to addressing the Maths Hubs strategic priority of *imbedding the teaching for mastery approach in primary schools so that pupils develop the deep knowledge and understanding they need to be fully prepared for the secondary mathematics curriculum*

C. Broad Work Group/Programme outcomes

Professional learning

- To develop a deep understanding of the principles and pedagogies underpinning teaching for mastery;
- To develop subject knowledge with an emphasis on progression within key areas of mathematics

Teaching and/or leadership practice

- To develop skills of teaching, planning and assessment which support a teaching for mastery approach;
- To be able to support other teachers in their own school in developing teaching for mastery approaches.
- To be able to design well-crafted lessons to support pupils' mastery;
- To consider approaches to medium- and long-term planning which emphasise coherence and careful step-by-step progression of key mathematical ideas.
- To utilise resources especially textbooks to support the design of well-crafted lessons to support pupils' mastery

Whole school/departmental policies and approaches

- To be able to support the head teacher in developing policies and systems (including curriculum and staffing / timetable developments) which support a teaching for mastery approach.

Pupil achievement, attitudes, participation or experience

- To support all pupils to develop a deep understanding of the mathematical ideas they are taught so that they fully meet the aims of the National Curriculum
- To develop positive attitudes towards mathematics
- To engage and motivate pupils to work hard

D. Work Group models

There is just one model which all participants engage in. This consists of:
Three x two-day residential training

The requirement to develop teaching of mastery in the participants' classroom
The requirement to work with the Year 1 teacher and other teachers in the school, to develop teaching for mastery.
The maintaining of a Professional Learning Log
The development of gap tasks
Developing and supporting a pilot Teacher Research Group in the training year

E. Work Group Lead requirements

The programme is developed and delivered by the NCETM Primary team

F. Work Group Lead support

This section is not applicable

G. Funding and Costs

Each Specialist is funded for 15 Days in the training year:
Participation in launch / residentials = 7 days
Developing mastery in own school = 6 days
Hosting practice TRG sessions = 3 days

Venue costs for the residentials are paid from the Maths Hubs Network.

Title	China-England Exchange 2018-19 (details to follow)		
Phase		**Strategic priority**	
Stage		**Project code**	**NCP18-02**

A. Project summary

B. Project rationale

C. Broad Work Group/Programme outcomes
Professional learning
Teaching and/or leadership practice
Whole school/departmental policies and approaches
Pupil achievement, attitudes, participation or experience

D. Work Group models

E. Work Group Lead requirements

F. Work Group Lead support			
What central workshops will there be for the Work Group Leads?			
Date (month)	Length	No. of venues	Key function of workshop

G. Potential Work Group costs

Title	Secondary Mastery Specialist Programme (Cohorts 2 & 3)		
Phase	Secondary	**Strategic priority**	2
Stage	Scaling up	**Project code**	**NCP18-03a and 03b**

A. Project summary

A mixture of central face to face sessions, Hub support and in-school development activities with an emphasis on developing specialists' own understanding of teaching for mastery and their own classroom practice in Year 1. In subsequent years, the programme will focus more on their role as a Professional Development Lead, initially developing their department (Year 2) and then working with teachers from other schools' departments (Year 3).

There will be a third cohort of Secondary Mastery Specialists who will start their three years of training and work in September 2018. As with Cohort 2, each Hub will be initially assigned 3 places and any unfilled places will be offered to Hubs in areas with greatest 'need' (deprivation, low Specialist to schools served ratio etc.). The positions will be advertised centrally in April with applications going directly to Hubs and a deadline to notify NCETM of Mastery Specialists' details in July.

B. Project rationale

Many teachers across the Hub regions are becoming interested in understanding the principles and pedagogies underpinning teaching for mastery. For this to develop from individual enthusiasms to long term, sustainable, developments across a secondary mathematics department there is a need to engage such teachers in practice-based professional development activity, consideration of leadership and management issues and (together with the senior leader and/or head of department) the development of departmental systems.

Also, many primary schools are adopting teaching for mastery approaches and over the next few years, pupils will be entering year 7 with an expectation of some continuity and progression in classroom practice, pedagogy, curriculum and lesson design. This work is important to prepare for this continuity and progression from Year 6 to Year 7.

This programme is part of a strategy to recruit, develop and deploy Secondary Mastery Specialists across the Maths Hub Network to support and develop Teaching for Mastery approaches.

The key aim of this project in 2018/19 is to have specialists who are experienced in teaching for mastery and are ready in subsequent years to develop their own department's practice, pedagogy and systems (Year 2) and the practice, pedagogy and systems of other departments in their area (Year 3)

The ultimate aim is to have over 1700 secondary schools developing and embedding Teaching for Mastery by 2023, either through having a Mastery Specialist within their department or through the department working with a Mastery Specialist.

C. Broad Work Group/Programme outcomes

Professional learning

- a deep understanding of the principles and pedagogies associated with teaching for mastery;
- an appreciation of what constitutes effective CPD;

Teaching and/or leadership practice

- effective teaching, planning and assessment which support a teaching for mastery approach;
- the development of effective PD leadership skills including planning, executing and evaluating activities which support teachers in developing their own practice

Whole school/departmental policies and approaches • understanding of the principles and pedagogies associated with teaching for mastery;
Pupil achievement, attitudes, participation or experience • there are high levels of achievement in mathematics; • pupils enjoy mathematics lessons and have a positive attitude to learning the subject

D. Work Group models

There is only one model for this Work Group, as follows:

03b (cohort 3)

Year 1 – 15 days comprising:

- 4.5 days attending central residentials;
- 11.5 days in-school development, including:
  - meeting with Hub's Secondary Teaching for Mastery Lead and wider team;
  - visiting classrooms (Primary and Secondary) to see TfM in action;
  - attending Shanghai Showcase events

03a (cohort 2 – already underway)

Year 2 – 15 days comprising:

- 3 days attending residentials;
- 8 days in-school development, including:
  - meeting with Hub's Secondary Teaching for Mastery Lead and wider team;
  - visiting classrooms (Primary and Secondary) to see TfM in action;
  - attending Shanghai Showcase events;
- 4 days acquiring PD Lead status (this will be centrally funded), or, if the SMS already has this accreditation, 4 days doing wider Hub work related to TfM as directed by the Secondary Teaching for Mastery Lead.

Year 3 **(cohort 1 – please see NCP 18-12)**

- 15 days leading a WG comprising 2 teachers from each of 2 schools to support them in embedding TfM within their own departments.

E. Work Group Lead requirements

N/A

This is a national programme. The participants (Secondary Mastery Specialists) will attend central sessions which will take place at 2 or 3 locations.

F. Work Group Lead support

N/A

What central workshops will there be for the Work Group Leads? N/A

G. Potential Work Group costs

Each Secondary Mastery Specialist's school receives Secondary TfM Variable funding at £3000 each year to enable participation in the first two years of the programme:

- Year 1 to cover 15 days' worth of time. **(03b – cohort 3)**
- Year 2 to cover 15 days' worth of time **(03a – cohort 2)**

Year 3 of the programme involves specialists running a WG and this will be funded separately through NCP

18-12.

Title	NCETM PD Lead Development and Accreditation Programmes (Primary, Secondary, Advanced Level, Early Years and Core Maths)		
Phase	All phases	**Strategic priority**	4
Stage	The Primary, Secondary and A-Level programmes are at the scaling stage. The Early Years and Core Maths Programmes are at the development stage.	**Project code**	**NCP18-04**

A. Project summary

This is a programme of 3 face to face days over the course of 2018/19 together with institution-based work and individual study undertaken in between these days.
Participants will undertake to plan, run and evaluate a professional development programme for a group of teachers / practitioners* during the course of the 3-day programme and to record their planning, evaluation and reflection in a suite of PD lead documents (a Programme Planning and Evaluation Template (PET), a Session PET and a Reflection and Learning Journal)
Successful completion of the programme and satisfactory completion of all tasks and related paperwork will result in the participant being accredited as a NCETM Accredited PD Lead.

*In the case of the early years programme

B. Project rationale

An essential aim of the Maths Hubs Network's is to promote high quality, collaborative professional development for all teachers of mathematics.
To achieve this aim it is important to ensure that there are enough people with the skills and capacity to lead, facilitate and support the professional development of others both within and across schools.
This programme is part of a strategy to support the development of PD Leads across the network, thus building the range of operational partners supporting the work of hubs.

C. Broad Work Group/Programme outcomes

Professional learning

- to consider what constitutes effective CPD and the role of the PD lead in this in terms of planning, executing and evaluating PD events, Work Groups, projects and programmes.
- to be aware of some fundamental themes and issues in mathematics and the teaching of mathematics (including those related to the demands the National Curriculum and relevant examination board syllabuses and those related to teaching for mastery) and to consider the implications of these in the context of supporting other teachers.
- to develop an understanding of the full range of potential outcomes of mathematics professional development, including knowledge, attitudes and dispositions; practice development; school approaches/policies; pupil outcomes
- to develop an understanding of effective models of mathematics professional development, the rationale for using them and the evidence that supports them

Teaching and/or leadership practice

- design support for mathematics professional development drawing upon a range of evidence-informed models and activity
- lead planned mathematics professional development in ways that respond and adapt to the teachers they are supporting
- evaluate professional development taking into account evidence from both teachers and their school leaders

Whole school/departmental policies and approaches

- to support schools' (or early years' settings') development of a coherent approach to teaching mathematics for deep and lasting understanding taking into account the demands of the National

Curriculum, the EYFS Statutory Framework and relevant examination board syllabuses.
Pupil achievement, attitudes, participation or experience

D. Work Group models
There is only one model for this Work Group as indicated in the project summary section above.

E. Work Group Lead requirements
• All WGLs must be an NCETM Accredited PD Lead with an in-depth knowledge and understanding of the elements of effective CPD; • All WGLs must be an experienced teacher with excellent knowledge and understanding of mathematics and mathematics specific pedagogy (relevant to the appropriate phase) • There should be 2 WGLs for each WG

F. Work Group Lead support			
All Work Group Leads must attend all central workshops.			
What central workshops will there be for the Work Group Leads?			
Date (month)	Length	No. of venues	Key function of workshop
Autumn Term 2018	1 day	1	WGLs in all phases (early years, primary, secondary, Core Maths and A-level) to attend a development and support day to explain the rationale and structure of the programme and to familiarise them with the materials.
Spring Term 2019	1 day	1	WGLs in all phases to review the implementation of the programmes with an opportunity to share successes and challenges from day 1, further sharing of day 2 and 3 content and to outline the evaluation processes associated with this WG.
Summer Term 2019	1 day	1	This final day is an opportunity for all WGLs to review and reflect upon the programmes and to engage in some final moderation and quality assurance of the final submissions of paperwork from participants. The expectations regarding evaluation of the WG will be outlined and there will be an opportunity to begin planning for the final evaluation of the WG.

G. Potential Work Group costs
Hubs will set aside £400 in their hub budget for each participant that they sponsor. Any other costs will be funded through the Maths Hub Network Fund.

Title	Maths SLE School Improvement Support Networks (more details to follow)		
Phase		**Strategic priority**	
Stage		**Project code**	**NCP18-05**

A. Project summary
Note: this work will build on NCP17-05, but involve a shift towards funding the support of Maths SLEs rather than covering the costs of school improvement work.

B. Project rationale

C. Broad Work Group/Programme outcomes
Professional learning
Teaching and/or leadership practice
Whole school/departmental policies and approaches
Pupil achievement, attitudes, participation or experience

D. Work Group models

E. Work Group Lead requirements

F. Work Group Lead support			
What central workshops will there be for the Work Group Leads?			
Date (month)	Length	No. of venues	Key function of workshop

G. Potential Work Group costs

Title	LLME support network		
Phase	All	**Strategic priority**	1
Stage	*Development*	**Project code**	**NCP18-06**

A. Project summary

This is a continuation of the work started in 2017-18 to build relationships between Maths Hubs and their LLMEs and develop networking opportunities.

LLMEs are leaders of mathematics education who are working beyond their own institution, for example, Maths SLEs, registered NCETM Accredited PD Leads, Maths Hub Work Group leaders (including Teaching for Mastery specialists). The LLME network does not support subject coordinators or heads of maths working only within their internal leadership role. Working with this community is an important part of the Maths Hub leadership role and so the network is likely to be sustained in future years. There is also the intention to work more closely with regional teaching school networks to ensure support is provided for Maths SLEs.

Hubs are asked to maintain an up-to-date list of the LLMEs within their region. Other outcomes are dependent on the activity within each Hub and each activity should be recorded and should have appropriate outcomes.

B. Project rationale

The LLME network does not support subject coordinators or heads of maths working only within their internal leadership role. Working with this community will be an important part of the Maths Hub leadership role and so the network is likely to be sustained in future years. There is also the intention to work more closely with regional teaching school networks to ensure support is provided for Maths SLEs.

Maths Hubs provide school-led subject system leadership. In order to achieve this, they need significant numbers of local leaders of maths education. Other support for local leaders of maths education is provided through the NCETM Accredited PD Lead programme (NCP18-04) and through the SLE workgroup (NCP18-04). But there is a need for further support through ongoing LLME networks.

It is hoped that, during 2018-19, all Maths Hubs Leads will be facilitating a least one network for at least one group of their LLMEs.

C. Broad Work Group/Programme outcomes

Professional learning

Network activity will support the participants in developing appropriate and up-to-date maths education professional development knowledge. In some networks there is a strong focus on looking at current educational research or initiatives in relation to professional practice.

Teaching and/or leadership practice

Members of the network will continue to develop their maths education local leadership practice

Whole school/departmental policies and approaches

n/a

Pupil achievement, attitudes, participation or experience n/a

D. Work Group models
Each hub can decide how to build this Work Group, based on current work with LLME in their area. Some further ideas and examples of effective practice will be available from the 2017-18 PCT at the July forum. It is hoped that, during 2018-19, all Maths Hubs Leads will be facilitating at least one network for at least one group of their LLMEs.

E. Work Group Lead requirements
The Maths Hub Lead is responsible for monitoring this project.

F. Work Group Lead support
Through PCT and forum discussions and through the annual pan-regional LLME conferences.
What central workshops will there be for the Work Group Leads? N/A

G. Potential Work Group costs
~£2000

Title	Early Years		
Phase	Early Years	**Strategic priority**	5
Stage	Development	**Project code**	**NCP18- 07**

A. Project summary

One of the key issues for the development of mathematics is the quality of training that practitioners have received prior to entering the profession. This was identified in the Maths in Early Years Education Report (2015) and Bold Beginnings (2018). The development of Early Years SK has been a key aspect of hub work and hubs have indicated via the planning survey that this continues to be a important area for development.

To support with this the NCETM EY NCP work will offer 2 types of NCP Workgroup to support practitioners at each stage of their professional development.

1) To support entry level EY practitioners (new to post or those with limited Early maths experience / training) – this will focus on key concepts in EY mathematical development
2) To develop established practitioners (those that have been working in Early Years for 3+ years and have identified aspects of mathematics practice that they wish to develop further. These Work Groups will focus on the development of research informed practice and starting to develop wider practice

B. Project rationale

The APPG report for Early Years Education categorised its findings into three sections:
The Curriculum
The Workforce
Parents
The work of the NCETM will focus on the development of the workforce and recognises the issues identified in the APPG report:
"Most of the experts agreed that providing better training in early years maths development is essential to start improving children's understanding of maths at a young age."
RECOMMENDATIONS:
*All **early years practitioners**, both new entrants and the existing workforce, should be trained in children's mathematical development.*
*The government should extend its **Maths Hubs programme** to include pre-schools.*
The government must provide more guidance for practitioners on the use of effective approaches and resources.

1. The NCETM hubs have all indicated through their workgroups in 2017 / 2018 and their responses to the 2018/2019 planning survey that the issue of specific subject knowledge is an area that still needs to be addressed. Work Groups that have offered this have tended to be oversubscribed and hubs report that at a local level there is a high demand for this level of work. The key aim of this project is to strengthen the SK base and the effective pedagogies in Early Year mathematics. This project will develop from last year's work around SK.
2. Some hubs have identified that they need to offer something for the practitioners that are interested in extended their practice through more focused projects that will deepen the practitioners understanding and enrich the provision in their setting. Hubs may wish to consider the journey of PD that they offer to support practitioners at differing points in their career. For the more established practitioner engaging in a 'focused projects' workgroup will support with practice development within and beyond their environment and support them with developing their leadership capacity.

These focused issues could include:

- Language Development (building on from last year's work)

- SK focus on Pattern
- A research informed project i.e. Early Intervention Approaches (EEF)

These offers may be building on from work that your hub has already undertaken at a development phase or may be an issue that needs to be addressed.
The key aim of this project is to further develop the practice of an established practitioner and for this learning to have impact across the wider provision

Beyond 2018 / 2019 these projects will continue to develop. The aim is that there will be an established SK offer for EY practitioners entering the sector. The focused project strand will continue to respond to key research and offer hubs the opportunity to address local issues, explore the evidence base and to explore aspects of practice and the impact they have. Some of these projects will progress to the effectiveness phase but some may need additional development.

C. Broad Work Group/*programme* outcomes

Professional learning

- Know the progression within one key area of EY mathematics i.e. cardinality, composition, change, comparison
- Use the principles and pedagogies of Early Years best practice to ensure that all children are provided with access to deep mathematical learning across the environment
- Identify what a TFM approach could be and how their practice is developing aspects of this to support effective transition
- Increase the participant's knowledge base with regards to an aspect of EY maths practice or pedagogy through engaging with research and exploring implications for practice
- Review and analyse own practice considering reading and collaboration with peers

Teaching and/or leadership practice

- Developed planning and practice to ensure that planning and provision for Early Years mathematics develops key concepts and progression can be articulated
- Review practice considering research, adjust aspects of practice in line with professional learning and evidence the impact of adjustments made

Whole school/departmental policies and approaches

- Development or revision of current policy to ensure a clear set of principles (relating to one key concept but replicable across others) that forms the basis of EY plans which are articulated in relevant policy documents
- School leaders to review EYFS provision considering reviewed policy documents
- Impact of practice adjustments shared widely within and across provision and action plans reflect the approaches expected (linking to appropriate policy documents)

Pupil achievement, attitudes, participation or experience

- A developed use of structured representations so that pupils are supported with fully exploring (and/or articulating) their mathematical ideas
- A development of the range of mathematical opportunities provided which is reflected across the wider setting
- Promotion of a positive attitude towards mathematics, so that all children demonstrate a willingness to 'have a go'
- Increased level of engagement / response/ confidence/ attitude 9dependent on the adjustment to practice)

D. Work Group models/programme design

The Work Group models available:

1- This will develop from the Work Group this year which worked over 4 days focusing on one of the key concepts for Early Years. Hubs will have their own version of this and work will be centrally collected in July 2018. There will also be the opportunity for WG leads to share what has worked well, and hub

models may adjust accordingly (some of this was started in the January workshop)
Work can be shared via the community with time in central workshops for networking and sharing of practice. The evaluation framework does allow for hubs to be flexible, but consideration does need to be given to the length of the project i.e. not too short as research is currently indicating that PD needs to be sustained for at least 50 hours to have impact – Professor Jeremy Hodgen BCME 9 April 2018

2- There will be several focused projects themes available for hubs to select from with some models that have developed from work of existing Work Group leads. There will be the opportunity in the July workshop to network with some existing project leaders and to continue that to support with local hub work in the next academic year. The evaluation framework does allow for hubs to be flexible, but consideration does need to be given to the length of the project i.e. not too short as research is currently indicating that PD needs to be sustained for at least 50 hours to have impact – Professor Jeremy Hodgen BCME 9 April 2018

E. Work Group Lead requirements

EY WG leads should have the following:

- direct, substantive experience of working in the 0-5 phase and demonstrate understanding of best practice in aspects of EY pedagogy
- strong subject knowledge with regards to early mathematics concepts
- Worked with moderation and can support with identification of greater depth attributes
- Permission to be released from their setting (if applicable) for the full duration of the work group and for the attendance at national workshops
- Aware of the expectation that they will evaluate the work of their NCP and share their contributions across hubs.

F. Work Group Lead support

1 – extending from work done in 2017/18 so materials will be available as part of the community (this will continue to develop)
2 – some central materials to be available i.e. Pattern materials, Language Development materials. There will be opportunities to network to share aspects of research that may be collectively used.

What central workshops will there be for the Work Group Leads?

Date (month)	Length	No. of venues	Key function of workshop
Sep 2018	1	1	To work in working groups according to the NCP selected SK / Focused project and to share materials / have presentations form WG leads that have developed these materials Update on national work
November 2108	Webinar (1 ½ hours)		To keep in touch with WG leads that have experience of the focused project to identify key strengths / areas for development
February 2019	1	1	To work in working groups according to the NCP selected SK / Focused project and to share materials / have presentations form WG leads that have developed these materials Update on national work

			Identify areas for consideration for next NCP
April	Webinar (1 ½ hours)		To keep in touch with WG leads that have experience of the focused project to identify key strengths / areas for development
July 2019	1	1	To share findings / peer moderate To begin to work in NCP groups for future work

G. Potential Work Group costs
1 –Subject Knowledge *WGL time:* 3 days delivery *face to face with workgroup* 2 days preparation 1-day evaluation 1 day visit 2 gap tasks + venue costs / local level resources (3 days at central workshop) 2 – Focused Project – may vary according to project selected i.e. days may be 6 x ½ day *WGL time:* 3 / 4days delivery *face to face with workgroup* 2 / 3 days preparation 1-day evaluation 1 day visit 2 sites to observe practice + venue costs / local level resources

Title	Primary Teaching for Mastery Work Groups		
Phase	*Primary*	**Strategic priority**	*1*
Stage	Scaling-up	**Project code**	**NCP18-08**

A. Project summary

This is part of the continuing programme to develop the teaching for mastery in mathematics in primary schools. Each hub has a group of primary TfM specialists who have taken part in the national training. Each of these specialists leads a group of 6 or 7 schools in developing their approach to Teaching for Mastery

B. Project rationale

For Teaching for Mastery to develop from individual enthusiasms to long term, sustainable, whole-school developments there is a need to engage teachers and subject leaders in practice-based professional development activity and (together with the head teacher) consideration of leadership and management issues and the development of whole-school systems.
A key aim of these Work Groups is to develop groups of schools where strong curriculum, teaching and professional development practices related to mathematics can be shared more widely across the Hub region.

C. Broad Work Group/Programme outcomes

Professional learning

For all teachers (including lead teachers):

- enhanced mathematics subject knowledge with a particular emphasis on progression within key areas of mathematics;
- a deep understanding of the principles and pedagogies related to teaching for mastery.

For lead teachers and head teachers:

an appreciation of and commitment to the importance of embedded, collaborative professional development structures in the school to support deep and sustainable professional learning and practice;

Teaching and/or leadership practice

For all teachers (including lead teachers):

- effective teaching, planning and assessment which support a teaching for mastery approach;

For lead teachers:

- effective support for other teachers in their own school in developing teaching for mastery approaches.

Whole school/departmental policies and approaches

- a clear set of principles, policies, practices and systems (including curriculum and staffing / timetable developments) which embody a mastery curriculum and a teaching for mastery approach;
- systems to support ongoing professional learning established.

Pupil achievement, attitudes, participation or experience

- all pupils develop a deep understanding of the mathematical ideas they are taught so that they fully meet the aims of the National Curriculum (i.e. fluency, reasoning and problem solving);
- all pupils show a positive attitude towards mathematics, enjoy learning the subject and demonstrate a growth mindset.

D. Work Group models

This is a nationally agreed model where the specialists lead groups of 6/7 schools. Each school sends two teachers to half termly meetings arranged by the specialist. These meetings give opportunities for joint observation of lessons as well as collaborative planning. After each of these meetings all schools agree actions that they will take before the next meeting. Each term the specialist will visit each of the schools to support the school in its development of its action plan.

E. Work Group Lead requirements

All specialists will have taken part in national training.

F. Work Group Lead support

All WGLs receive support from the Maths Hub TfM lead. This is locally agreed.
There will be a national conference for all specialists during the year.
In their second year specialists attend the national programme of PD lead for specialists

What central workshops will there be for the Work Group Leads?

Date (month)	Length	No. of venues	Key function of workshop
Cohort 3 PD lead programme Dates to be agreed	3 days	6 venues	

G. Potential Work Group costs

The maths hub receive primary TfM variable funding for the Work Groups:

- specialists to be funded at £350 per day for the days when working with other schools and £200 per day for their other time (e.g. For a 6-school WG: 24x350+6x200)
- each Work Group school to receive £1000 towards teacher release time
- each Work Group school to receive up to £2000 of matched funding towards the costs of textbooks

Travel costs for the Mastery Specialists will continue to need to be covered from Maths Hubs Core funds as in the last two years.

Title	Sustaining (2017/18) Primary TfM Work Groups		
Phase	*Primary*	**Strategic priority**	*1*
Stage	Scaling up	**Project code**	**NCP18-09**

A. Project summary

This is an NCP for all schools who are part of a work group supported by primary mastery specialist in the academic year 2017-2018. Each work group will be able to access £4000 for ensuring that momentum gained this year is continued and that schools are building effective structures to ensure that TfM is embedded in the school. In order to access the funding each work group will need to show how they have developed a plan that will enable school leadership to evaluate their approach to TfM and to embed TfM across the whole school. The NCP will learn from the intelligence gathered from this year about successful strategies for embedding Teaching for Mastery in a school.

B. Project rationale

The schools in this NCP will have been working in the current academic year on developing their approach to TfM. This NCP is to ensure that this momentum is maintained but it is also to support schools in ensuring both that there is a consistent approach to TfM across their school and that this approach is supported by the structures within the school.

The project aims to:

- consider the management structures that a school needs to ensure that its vision for TfM is effectively implemented
- to further develop teachers and SLTs understanding of teaching for mastery
- to build on the understanding that schools have built in their work with the Teaching for Mastery specialists and to address any barriers that schools are identifying.

In following years schools might identify particular aspects of TfM that still need development and continue to utilise maths hubs work groups to address these.

The project will give an opportunity for hubs to share their intelligence from the previous year of how school have managed to maintain momentum and the barriers that prevented this. This will be then used to design an effective programme for the 2018-2019 academic year.

C. Broad Work Group/Programme outcomes

Professional learning

- Develop deeper understanding of aspects of the mathematics curriculum as identified by the school

Teaching and/or leadership practice

- School has medium term planning that ensures learning for children is a coherent journey and also allows children to build a deep understanding.
- Teachers demonstrate that are they able to plan coherent lessons that allow all children to access the lessons
- Teachers use appropriate representations of the mathematics being taught and emphasis to the children that this representation is to help them understand the structure of mathematics
- Teachers ensure that children are giving clear explanations of mathetical ideas and that they have opportunities to reason
- Exercise are set for children that allow the children to explore their understanding

Whole school/departmental policies and approaches

- Have a clear policy for the development of TfM that includes:
    - Consideration of how the timetable needs to be adapted including length of lesson
    - Timetabled opportunities for children to have opportunities for independent practice?

- Interventions organised to ensure that all children are able to access lessons
- Assessment that ensures all children having met the requirements of the school curriculum
- Monitoring of teaching that take account of TfM approaches
- School has a clear programme for ensuring that TfM continues to be developed in this and subsequent years

Pupil achievement, attitudes, participation or experience

Pupils have a deep understanding of topics being covered that is demonstrated by:

- Ability to verbalise their understanding in sentences using appropriate mathematical language
- Ability to use representations to demonstrate the mathematical structures being used for both procedural and conceptual understanding
- Be fluent in appropriate number facts
- Demonstrate a deep understanding of topics taught.

D. Work Group models

There will be opportunities for work groups to build their own models that meet local circumstances. However in order to access the £4000 funding each work group will need to show how they are addressing:

- Using collaboration across schools to support school leadership to consider the implications of a TfM approach and how to ensure that it is being implemented across the school
- Has identified opportunities both within and across the schools to ensure that teachers are collaborating on both planning and developing their practice
- Have ensured that there is a plan for the work group which has identified activity for the work group and has also considered how the work group will evaluate impact

E. Work Group Lead requirements

Each work group will need be led by a WGL who will need to :

- Have an understanding of a vision for TfM
- Have credibility to challenge schools in their approaches to developing TfM
- Be able to evaluate the progress of schools and offer suggestions for their development

Within a maths hub there will need to be somebody who will coordinate the work of the WG leads. This could be the TfM lead

F. Work Group Lead support

The TfM Leads will come together at a national level and

What central workshops will there be for the Work Group Leads?

Date (month)	Length	No. of venues	Key function of workshop
July 2018	day	1	Opportunity for TfM leads to identify the learning from this year's programme and to develop possible models for hubs to use.
September 2018	day	1	WG coordinators to develop models for the programme. Create mechanisms for evaluation of impact
December 2018	day	1	Review progress against WG plans

July 2019	day	1	Evaluate impact of work

G. Potential Work Group costs
Each work group will be able to access £4000. This money will be used to ensure that there is strong leadership of the group.

Title	Mastery Readiness (details to follow)		
Phase		**Strategic priority**	
Stage		**Project code**	**NCP18-10**

A. Project summary
This project is likely to run in Northern Maths Hubs

B. Project rationale

C. Broad Work Group/Programme outcomes
Professional learning
Teaching and/or leadership practice
Whole school/departmental policies and approaches
Pupil achievement, attitudes, participation or experience

D. Work Group models

E. Work Group Lead requirements

F. Work Group Lead support			
What central workshops will there be for the Work Group Leads?			
Date (month)	Length	No. of venues	Key function of workshop

G. Potential Work Group costs

Title	Lesson Design including the use of PD Materials and Text Books		
Phase	Primary	**Strategic priority**	Priority 1
Stage	Development	**Project code**	**NCP18-11a**

A. Project summary

The project will focus on designing effective lesson plans, making use of key resources such as the Mastery PD Materials and Text Books. There has been a large investment in both of these resources and making effective use of them will support schools in embedding Teaching for Mastery in mathematics. The project will also make use of the planning guidance developed during the 2017-18 NCP and extend it as there are more PD Materials to draw on. The work will also be aimed at schools that have taken up the Text Book funding.

B. Project rationale

Much funding has been invested in developing the Mastery PD Materials and into the matched funding for text books and it is important that schools make effective use of both in designing mathematics lessons. The project is still as the development stage as, due to the detailed work involved in releasing the PD Materials, the focus had to be more generally on the thinking process behind good TfM lesson design. The project n 2018-19 will be able to have a clearer focus on using the materials and text books whilst also drawing on the work that has been done this year in developing guidance on planning for mastery in mathematics.

As the PD materials continue to grow and more schools take up the matched funding for an increasing list of text books, the project may grow into an effectiveness work group to develop a consistency in the approach to using materials as a basis for good lesson design across all Hubs.

C. Broad Work Group/*programme* outcomes

Professional learning
Teachers will:

- have a deep understanding of the elements of effective lesson design
- develop their understanding of the big ideas in mastery and how they are found and used in effective lesson design
- be able to make reasoned decisions about what to include and what not to include in lessons
- identify what needs to be developed to supplement the information in the published materials

Teaching and/or leadership practice
Teachers will:

- be confident in producing planning for small steps in learning
- share good practice in effective lesson design with other teachers in their school

Whole school/departmental policies and approaches

- Practice developed and shared through engagement in the project will influence planning policy in the school

Pupil achievement, attitudes, participation or experience

- Impact of small steps in planning will be seen in progress in children’s books

D. Work Group models/programme design

The focus of the work group may vary depending on whether the schools involved are all using the same resource or text book. Where school are using a range of resources, the lead will have to be prepared to give more generic guidance about how a published resource can be used to support effective lesson design. This will be addressed through central workshops for Work Group Leads.

Where Hubs are running this project for a second year, the work done in 2017-18 around the process of effective lesson design can be used to inform the work of the group in 2018-19. Central workshops will ensure that the work done in the first year is shared and built upon, where appropriate however the 2018-19 project will be suitable for Hubs who did not run it in 2017-18.

The structure of the work group is based around termly whole day meetings with the schools in the work group and then, in the other half term, meetings of schools across the group, in pairs. These smaller groups are to give the teachers a chance to plan and deliver lessons together. These groups to be selected according to the materials they are using. WG Lead to arrange to visit some of these meetings, as their time allows, in order to support the evaluation process.

E. Work Group Lead requirements

Experience of Primary Teaching for Mastery in mathematics and leading mathematics in a primary school. If the lead is running the work group for a second year they would still need to attend the central days for WG leads due to the change in focus of the work in this second year. One lead required for each work group.

F. Work Group Lead support

There will be an online community to support the work of the leads where regular updates on the PD Materials will be shared. The documentation produced by the work groups in 2017-18 will also be made available.

What central workshops will there be for the Work Group Leads?

Date (month)	Length	No. of venues	Key function of workshop
Sep 2018	1 day	1	To share the aims of the project and to look at the PD materials and text books, considering how to make best use of them to support the project work. Evaluation documentation to be shared and ideas for evidence collection.
Feb 2019	1 day	1	To consider examples of planning so far, update on the latest elements of the PD Materials and to work on planning of remaining days with work groups. Discussion of evaluation and evidence.
June 2019	1 day	1	Evaluation support

G. Potential Work Group costs

3 face to face meetings for the whole group and venue costs
3 further days for WG Leads to plan and monitor the meetings of smaller groups
1 day for WG evaluation

Title	Intervention in a Mastery Context		
Phase	Primary	**Strategic priority**	Priority 1
Stage	Development	**Project code**	**NCP18-11b**

A. Project summary

The project will consider different models of intervention in a mastery context to ensure that mathematics teaching has maximum impact for all children. Participant teachers and leaders will further their understanding of teaching for mastery by using case studies and research to inform their practice. Schools will trial a model of their choice and will document their observations to share with others.

B. Project rationale

Whole class teaching is becoming embedded across schools using a Teaching for Mastery approach. Once this has begun to be established, a school may identify a need to make improvements to how it facilitates intervention in mathematics. It is evident that models of intervention need exploring further to ascertain how schools can include this vital aspect of Teaching for Mastery.
Building on findings from the Network Collaborative Project that ran in 2017-18, we would like to offer more schools the opportunity to explore models of intervention in order that most pupils will keep up with the whole class teaching that Teaching for Mastery supports and so that pupils fulfil " the expectation that the majority of pupils will move through the programmes of study at broadly the same pace" (National Curriculum for Mathematics, 2014).
This would be ideal for schools who have previously engaged in Teaching for Mastery activities such as the Work Groups and are beginning to make commitments to sustain this approach in their schools.

C. Broad Work Group/*programme* outcomes

Professional learning
Teachers will:

- Deepen their understanding of Intervention in Teaching for Mastery context
- Engage in research and case studies which exemplify possible intervention models in order to decide on a model to trial.

Teaching and/or leadership practice
Teachers will:

- Trial a model of Intervention and consider the impact of it on the child and their learning
- Be able to plan and deliver intervention to promote a 'keep up' approach

Whole school/departmental policies and approaches

- Schools will review the impact of their current practice and be open and flexible to making organisational and attitudinal changes to existing models. By participating in this project, they may change policy and practice to intervention in their schools.

Pupil achievement, attitudes, participation or experience

- Although there may be circumstances where 'catch up' programmes are still necessary, most pupils will access whole class teaching due to swift and timely interventions in order to keep up, when needed.

D. Work Group models/programme design

In 2017-18, there were three distinct models presented; a pre-teach to enable pupil engagement in the whole class teaching and learning, Same Day Intervention and one from Every Child Counts which is a programme of support for Teachers and Teaching Assistants. Work Group Leads were invited to base their local project plans on one of these or a model of their choice.
We would welcome other models to be presented for consideration by Work Group Leads and we will be using findings from 2017-18 at Day 1 of Central Development.

E. Work Group Lead requirements
Experience of Primary Teaching for Mastery in mathematics and leading mathematics in a primary school is vital. *If the same Work Group Lead is running the work group for a second year* they would not be required to attend Central Workshops but would be invited to contribute to and benefit from distance support such as webinars and the online community. *If the Work Group has been run in the same hub but there will be a new Work Group Lead*, the hub can decide if the Lead needs to attend the Central Workshops. Alternatively, they can access support, if available, from the previous lead although it would be recommended that they access both forms of support. **If the hub has not been part of the NCP in 2017-18, it is required that the Work Group Lead attends the full Central support programme.** Dependent on experience, an estimate of the time needed to run this project locally, when the hub is accessing Central Development 3 days to attend Central Development (see below) 1 day planning and completing a project plan in conjunction with the hub leaders (including launch event or recruitment of schools) 1 day for planning the sessions with participants 3 days face to face days with participant schools and teachers 0.5 days <u>per participant school</u> for school visits 1 day for evaluation = suggested total 14 days (based upon 10 participant schools – all negotiable at hub level It is a requirement that the Work Group Lead submits a project plan to the Project Co-ordination Team after discussions with their local Maths Hub Leaders.

F. Work Group Lead support			
There will be an online community to support the work of the Leads and webinars to update and collaborate.			
What central workshops will there be for the Work Group Leads?			
Date (month)	Length	No. of venues	Key function of workshop
Early October 2018	1 day	1	Presentation on various models of Intervention in a mastery context. Beginning to understand expectations including examining the project plan Discussing collection of evidence
December 2018	1 hour	online	Webinar – how are recruitment / first sessions going?
Early March 2019	1 day	1	Reflections on project so far Engaging with research Examining evidence collected and discussing what to include in case studies
May 2019	1 hour	online	Webinar -
Early July 2019	1 day	1	Evaluation support – collaborating case studies, concluding lessons learned and next steps

G. Potential Work Group costs

Title	Planning for greater depth (Primary TfM Focused Issue)		
Phase	Primary	**Strategic priority**	Priority 1
Stage	Development	**Project code**	**NCP18-11c**

A. Project summary

The project will consider how to provide opportunities for all children to work at a Greater Depth than expected standard for their age group. It will focus on developing teachers' understanding of how to facilitate activities and questions in order to ensure that there is sufficient challenge for those children who are ready for it within the Teaching for Mastery context. This NCP differs slightly to the 2017-18 because we identified that it is more productive to focus on the Greater Depth aspect separately to the Assessment issues.

B. Project rationale

Whole class teaching is becoming embedded across schools using a Teaching for Mastery approach. Once this has begun to be established, a school may identify a need to make improvements to how teachers can provide opportunities for all children to work deeply and for some children at an even greater depth, in mathematics. It is evident that teachers and leaders need to be clear when planning for opportunities both within the maths lesson and the independent practice session, if this is separate. The skill of writing and using such tasks is a vital aspect of Teaching for Mastery.
Building on findings from the Network Collaborative Project that ran in 2017-18, we would like to offer more schools the opportunity to explore what it means to work more deeply and to collaborate with others when deciding how rich tasks can be used in order that pupils are not accelerated through the programmes of study but have a deep and sustainable knowledge of mathematics for their age.
This would be ideal for schools who have previously engaged in Teaching for Mastery activities such as the Work Groups and are beginning to make commitments to sustain this approach in their schools.

C. Broad Work Group/*programme* outcomes

Professional learning
Teachers will:

- Reflect their current practice surrounding this aspect of Teaching for Mastery
- Clarify their understanding of what 'Greater Depth' looks like in maths lessons
- Work collaboratively to design activities which give opportunity to work deeply and even deeper

Teaching and/or leadership practice
Teachers will:

- Be able to plan opportunities for challenge through the design of greater depth questions.
- Demonstrate being able to implement reflection and change of ethos to meeting the needs of all learners

Whole school/departmental policies and approaches
Schools will review the impact of their current practice and be open and flexible to making organisational and attitudinal changes to existing models. By participating in this project, they may change policy and practice to giving all pupils opportunity to work at a Greater Depth in their schools.

Pupil achievement, attitudes, participation or experience

- All pupils will have the time to access the mathematics deeply, with opportunity for all pupils to work at an even Greater Depth, where the teacher deems necessary.
- Even if children do not reach attempting the Greater Depth task, the conclusions of which are shared with the whole class so that it can be a learning point for them to be exposed to.

D. Work Group models/programme design
In 2017-18, Work Group Leads spent time considering how providing opportunities to work deeply was a change from 'high ability provision'. We looked at the role of journals and spent time looking closely at the role of intelligent practice and variation. Work Group Leads designed questions with their participant schools and collected children's responses to share more widely and discuss the impact of their work. We would welcome other models to be presented for consideration by Work Group Leads and we will be using other final findings from 2017-18 at Day 1 of Central Development.

E. Work Group Lead requirements
Experience of Primary Teaching for Mastery in mathematics and leading mathematics in a primary school is vital. *If the same Work Group Lead is running the work group for a second year* they would not be required to attend Central Workshops but would be invited to contribute to and benefit from distance support such as webinars and the online community. *If the Work Group has been run in the same hub but there will be a new Work Group Lead*, the hub can decide if the Lead needs to attend the Central Workshops. Alternatively, they can access support, if available, from the previous lead although it would be recommended that they access both forms of support. **If the hub has not been part of the NCP in 2017-18, it is required that the Work Group Lead attends the full Central support programme.** Dependent on experience, an estimate of the time needed to run this project locally, when the hub is accessing Central Development 3 days to attend Central Development (see below) 1 day planning and completing a project plan in conjunction with the hub leaders (including launch event or recruitment of schools) 1 day for planning the sessions with participants 3 days face to face days with participant schools and teachers 1 day for evaluation = suggested total 9 days It is a requirement that the Work Group Lead submits a project plan to the Project Co-ordination Team after discussions with their local Maths Hub Leaders.

F. Work Group Lead support			
There will be an online community to support the work of the Leads and webinars to update and collaborate.			
What central workshops will there be for the Work Group Leads?			
Date (month)	Length	No. of venues	Key function of workshop
October 2018	1 day	1	Introduction to the Work Group -rationale, aims and outcomes. Shared and deep understanding of what we mean by 'Greater Depth'. Introduction / revision to Intelligent Practice and Variation.
December 2018	1 hour	online	Webinar – how are recruitment / first sessions going?
March	1 day	1	Bring back examples of 'Greater depth' questions and activities produced by participant schools to discuss and moderate.

2019			Further discussion on evidencing progress in a Mastery context. Addressing issues raised and spotting key messages.
May 2019	1 hour	online	Webinar -
July 2019	1 day	1	Evaluation support – collaborating samples to distrobuted, concluding lessons learned and next steps

G. Potential Work Group costs

Title	Secondary Teaching for Mastery Work Groups		
Phase	*KS3 &4*	**Strategic priority**	*2*
Stage	Effectiveness	**Project code**	**NCP18-12**

A. Project summary

Each Secondary Teaching for Mastery Specialist will lead a Work Group in the third year of their programme (following two years of centrally planned input) to support two mathematics departments in developing their own practice and systems with regards to teaching for mastery.
Two teachers from each of two schools will become 'Mastery Advocates' within their own departments and will form the Work Group. They will work closely with a Secondary Mastery Specialist to understand the principles and practices associated with Teaching for Mastery and will begin to work with teachers within their own departments to embed these principles and practices. Work will initially begin in Key Stage 3, but it is intended that this will extend to Key Stage 4, certainly in the longer term.

B. Project rationale

There is a national target for half of the secondary schools in England to be committed to developing and embedding Teaching for Mastery by 2023. These WGs form part of the national strategy to achieve this. The role of the Mastery Advocate is crucial since external influences and input can only go so far in producing lasting and sustainable change. To have deep, sustained impact and bring about long-term change in the way mathematics is taught in a secondary school requires drive and enthusiasm from within the school's mathematics department so that once the external input and support is removed or reduced, development is unlikely to halt.

C. Broad Work Group/Programme outcomes

Professional learning
Mastery Advocates will have a deep understanding of the principles and practices associated with Teaching for Mastery. They will learn about the 5 big ideas, how these are being implemented in primary schools and gain an appreciation of how KS2 pupils' mathematical knowledge, skills and understanding are developing. They will consider the implications of this for KS3 practice and will learn about Teaching for Mastery practices that have already been explored and developed so far at KS3 as well as learning and developing skills through their own experimentation with the 5 big ideas.

Teaching and/or leadership practice
Mastery Advocates will explore ways of incorporating the 5 big ideas into their own practice and will then lead the teachers in their department in developing these approaches in their practice.

Whole school/departmental policies and approaches
Mastery Advocates will work to develop and embed Teaching for Mastery across their own departments. In the initial stages this will involve exploring approaches in lessons, but this will grow to include developing the departmental scheme of work and other departmental systems and structures to allow for a full Teaching for Mastery approach.

Pupil achievement, attitudes, participation or experience
Pupils will develop a deep and connected understanding of mathematics through spending more time ensuring that the foundations for development are securely in place before moving on. They will achieve both conceptual understanding and procedural fluency at each stage of their learning and see mathematics as a subject which is interesting, stimulating and enjoyable.

D. Work Group models

There is a single model for this Work Group.

Two teachers from each of two schools will work with each Secondary Mastery Specialist.

Work will be bespoke for each department, tailored to the needs of the teachers and their stage of development, but is likely to include:

- Mastery Specialist leading PD sessions with the 4 Mastery Advocates to enable them to understand the principles and practices associated with Teaching for Mastery.
- Mastery Specialists supporting the Advocates to enable them to run PD sessions for their department colleagues; this could include shared planning (and possibly co-leading) of sessions, but the intention is for the Advocates to take the leading role in working with their departments.
- Advocates observing Specialist in the Specialist's own school.
- Specialist observing and giving feedback to Advocates– this might be of, and following, a lesson, a PD session, a departmental meeting or a planning meeting.
- Joint planning of individual lessons, sequences of lessons or longer units of work.
- Specialists working alongside Advocates to support other departmental members as appropriate.
- Specialists working alongside Advocates to develop schemes of work and other departmental systems and structures to allow for a full Teaching for Mastery approach

One of the Mastery Advocates from each school should be an experienced teacher with substantial responsibility within the department and the authority to make change happen. This could be the Head of Department or Second in Department, the Key Stage 3 Lead or someone with a similar role.
The other Mastery Advocate from each school should have an interest in leading departmental developments and ideally would have substantial teaching experience, but in some circumstances *could* be a very keen, recently qualified teacher or a very committed non-specialist teacher.

The programme will be advertised centrally early in the Summer Term with applications sent directly to Hubs.

E. Work Group Lead requirements

Each Cohort 1 (and 1+) Mastery Specialist should lead a Work Group.

15 days of time – additional central funding (variable funding)

F. Work Group Lead support

The Hub's Secondary Teaching for Mastery Lead will be the main support mechanism for the Secondary Mastery Specialist leading the WG and will be instrumental in helping to decide exactly how the Mastery Specialist's time should be spent since the programme will be bespoke for the departments involved.

As indicated above, it is envisaged that most of the time will be spent with the specialist working alongside and supporting the Advocates in developing their own and their colleagues' practice and their department's structures and systems. There may also be benefit in attending a Hub organised Teaching for Mastery event for all Secondary WGs, support meetings with the Teaching for Mastery Lead and visiting a primary Mastery Specialist's classroom.

One day will also be required for the Mastery Specialist to attend the central Support Workshop.

What central workshops will there be for the Work Group Leads?

Date (month)	Length	No. of venues	Key function of workshop

November	1 day	2	Updates on key developments Explore ways of working with Departments – sharing practice, challenges and solutions with other Mastery Specialists.

G. Potential Work Group costs
£5250 per Secondary Mastery Specialist (each Cohort 1 and 1+ SMS should lead one WG of 2 schools) £2000 per WG school to enable the Mastery Advocates to work with the SMS and thus enable them to work within their own department. **Total of £9250 grant per Work Group**. Travel costs for Mastery Specialists will need to be paid out of core funding

Title	Mathematical thinking for GCSE		
Phase	*Secondary*	**Strategic priority**	2
Stage	*Effectiveness*	**Project code**	**NCP18- 13**

A. Project summary

This Work Group offers teachers and their departments high quality nationally coordinated support to address the reasoning and problem-solving challenges of the mathematics curriculum and its assessment in the new GCSE.

Many departments will be considering not only the long-term development of these skills across KS3 and into KS4, but also the immediate needs of current KS4 pupils facing the challenges of the new GCSE. This Work Group aims to support both these aspects through professional development activities focusing on practical and accessible classroom-based approaches.

Participation also offers opportunities for the engagement of the whole department and hence could provide the basis of an effective department improvement programme in this area. The PD activities themselves also offer a model for wider department improvement processes.

B. Project rationale

Reasoning and problem solving will continue to be at the heart of supporting schools as they engage with the new GCSE (secondary national priority) and improving pupils learning. As a priority area the practice and refinement of this NCP has resulted in high quality provision which is essential for real and sustained improvement to deliver the wider ambition of the Maths Hubs programme.

The continuation of this NCP for 2018/19 as an 'effectiveness' WG (*working alongside and making links with the emerging work of secondary TFM*), will allow further progress on the understanding and development of the most effective classroom, department and hub practice necessary to meet the hub ambition in this priority area.

In particular for 2018/19, explore how the NCP model can:

- Support schools understand how this workgroup fits alongside other hub provision (including the secondary TfM NCP workgroups) in order to promote more strategic, department improvement planning.
- Make clearer the links between the pedagogical approaches and key messages of this work group and that of others such as TfM.
- explore how to more widely engage participant's departments effectively and support the establishment of improved departmental professional development processes.
- More fully utilise the valuable participation and engagement of HEI partners to support the co-leadership of individual hub work groups *(and support the wider hub HEI partnerships).*
- Continue to grow and develop the numbers of reasoning and problem solving WGLs and deepen their expertise (key to building local hub capacity in this and related areas).
- Continue to refine activities and begin to share teachers work including the generation of resources that exemplify the teaching and learning approaches of the work group together with examples/case studies of emerging good department professional development practice.

This would represent an exciting opportunity for hubs to grow and develop local WGL expertise and HEI partnerships in this important priority area and make greater links in the WG provision of the hub.

- Where WGs that ran last year and the participating schools wish to continue collaborating as a

group, then it is likely that the hub should consider this as an innovation WG else independently funded by the schools themselves. Some central support for such groups is being considered.

C. Broad Work Group/*programme* outcomes

Professional learning

Teachers attending the workshops and other teachers in their departments will increase their experience and understanding of:

- the role of reasoning and problem solving in the new curriculum and the teaching and learning needed to support pupils develop these skills across all teaching.
- how these skills are tested in the new GCSE and what particular teaching and learning approaches can support current KS4 pupils address these challenges.
- effective collaborative approaches to embedding developments more deeply

Teaching and/or leadership practice

Teachers attending the workshops and other teachers in their departments will have gained:

- improved confidence in planning and delivering lessons reflecting teaching and learning approaches that support greater reasoning and problem solving in all lessons.
- broadened their repertoire of activities/approaches and resources that develop pupils' mathematical reasoning and problem solving skills across all teaching, including supporting pupils address challenges of new GCSE questions.
- experienced department processes for collaborative development
- opportunities to lead and develop PD in their own departments
- the opportunity to evaluate the impact of participation in the WG and will have identified actions to continue improvement in this aspect of teaching and learning

Teachers and departments will have:

- opportunity to produce resources that exemplify key teaching and learning approaches to support work in this area
- considered how collaboration and PD might affect wider department PD approaches
- considered next steps for further implementing changes as a result of participation in the WG

Pupil achievement, attitudes, participation or experience

Pupils may begin to demonstrate:

- improved confidence when they engage in mathematical reasoning and problem solving.
- the use of these skills to solve problems but also deepen their understanding of mathematics content itself.
- Improved attitudes towards mathematics and the value of reasoning and problem solving skills

D. Work Group models/programme design

This tried and tested work group model follows a workshop gap task cycle consisting of 4 workshops followed in each case by a gap task.

- Each workshop will provide an opportunity to engage collaboratively with generic approaches aimed at generating opportunities for all pupils to reason problem solve across the curriculum as part of every lesson.
- Principally the PD will arise from focussing on the impact of these approaches on pupils' skills and learning in this area. This will be done through a form of lesson study suitable for the project and will be key to wider department engagement.

- Subsequent workshops will provide important PD feedback opportunities on impact on learning observed in the lesson study. Support of an HEI co leader is particularly beneficial here).
- Ideally each school should provide two teachers to attend workshops and lead developments back in the department alongside the full support of the subject leader

All the materials, resources, approaches and workshop plans will be provided.

E. Work Group Lead requirements

- Work groups should be led by an experienced mathematics teacher/consultant who has led PD in their school or other schools (some experience of 'lesson study' would be useful, but support will be given).
- Key to maximising the professional develop in the workshops is the requirement that the WGL should be supported in leading the workshops by an appropriate HEI representative recruited by the hub from a local HEI.
- **Where a WGL has previously been involved in running NCP17-09 from last year** provision will still be offered to support them in the form of a requirement to attend **2** central WGL days (rather than 3½ as is the case for new WGLs). *A key aim is to expand the pool of WGL expertise in this area hence the need for recruiting WGL's new to this WG but we also want to deepen expertise hence the usefulness of some WGL's continuing.*

F. Work Group Lead support

- Access to the NCP on-line community
- Central training workshops: 3 ½ days (new WGLs) 2 days (for previous NCP-09 WGLs)
- Workshops will include opportunities for professional development needs of WGL's to be addressed
- All the materials, resources, approaches and workshop plans will be provided.

What central workshops will there be for the Work Group Leads?

Date (month)		Length	No. of venues	Key function of workshop	
				New WG Leads	Existing WG Leads
Day 1a	*Sept 2018*	1/2 day **3 - 6pm** Meal & overnight	1	Introduce new WGLs to the project together with some PD work on lesson study and managing workshop feedback sessions. *Residential overnight enabling attendance at following training day (1b)*	Not required
Day 1b	*Sep 2018*	1 day **11-4pm**	1	**Joint new and previous WGLs -** *Day divided with some common sessions and some separate for new and existing WGLs.* Prepare for delivery of first two workshops (1 & 2)	
Day 2	*March 2019*	1 day **11-4pm**	1	Feedback on workshop1 and 2 and prepare for delivery workshop 3 & 4	*Optional attendance if they so wish – this would enable them to join feedback on workshops etc.*
Day 3	*July 2019*	1 day **11-4pm**	1	**Joint new and previous WGLs** Feedback on workshops and WGL evaluation of provision	

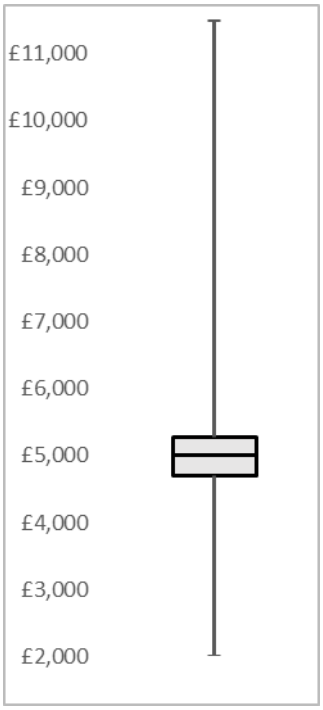
G. Potential Work Group costs

Attending central training: 3½ days (new WGLs) or 2 days (if WGL is a previous NCP-09 WGL) *Note that they may also wish to attend the optional date.*

4 days for WGL to deliver hub workshops together with venue costs

4 days HEI cost (co-leading with WGL participant workshops)

There were 40 NCP17-09 Work Groups in 2017-18 with median funding allocation by participating hubs of £5000.



Title	*Year 5 – 8 Continuity*		
Phase	Primary/Secondary	**Strategic priority**	*1 and 2*
Stage	Development	**Project code**	**NCP18-14a and 14b**

A. Project summary

The project aims to improve communication between Key Stages 2 and 3 by taking an aspect of the mathematics curriculum or a pedagogical approach as the focus for the work.
Teachers from different phases work together to develop a consistent approach to their chosen aspect through discussion, joint lesson design and delivery, observation and the development of documentation to support continuity. As a result, channels of communication are established and there is an increased focus on curriculum and pedagogical continuity at key transition points which supports children as they move from KS2 to KS3.

B. Project rationale

This year there have been two distinct models running; one where Hubs have decided on their own focus to the work and the other where Multiplicative Reasoning has been the focus. Both models will be offered again for 2018/19 as development workgroups building on the successes so far with additional guidance included giving examples of successful organisation and session content.

The MR Work Group explored how the resources and approaches from the KS3 MR project could best be used to achieve the Yr 5-8 aims. Much has been learned and this will inform the model for 2018/19.

The Work Groups will target new clusters of secondary and feeder primary schools but it is hoped that schools involved this year will continue to communicate using the structures built during the work in 2017-18. Beyond 2018-19 it is hoped that successful structures will become effectiveness Work Groups.

C. Broad Work Group/*programme* outcomes

Professional learning

- Teachers will gain knowledge, understanding and experience of the curriculum at KS2 and 3
- Teachers will gain understanding and experience of the key principles of Teaching for Mastery at Primary and Secondary
- Teachers will gain understanding of the representations and structures used in both Key Stages and how these support the development of sound mathematical understanding
- Clear understanding of what pupils leaving KS2 are expected/able to do at all levels of attainment
- Teachers involved in the work groups will share and disseminate good practice within their own schools and departments

Teaching and/or leadership practice

- Shared approaches to planning and delivery of the mathematics curriculum across KS2 and 3
- Participation in Lesson Study as a model for CPD

Whole school/departmental policies and approaches

- Progression in calculation documents produced across phases to ensure continuity in approaches and representation across KS2 and 3 in local areas
- Shared policies on aspects of the teaching of mathematics across schools
- Consistent use of resources and representation (especially children working below ARE at the end of KS2) to give them the best chance of making good progress as they move from KS2 to KS3

Pupil achievement, attitudes, participation or experience

- No dip in attainment in mathematics as pupils move from KS2 to 3
- Vulnerable pupils (as detailed above) making good progress through KS3

- Pupils seeing mathematics as an interesting and exciting subject at KS2 and KS3

D. Work Group models/programme design

This year there have been two distinct models running; one where Hubs have decided on their own focus to the work and the other where Multiplicative Reasoning has been the focus. The structure of the MR work groups has been more fixed than the other model where hubs have organised the work in different ways to suit local needs.

Some hubs running the more flexible model have found that engagement has been greater when sessions are run as twilights across the year whereas others have planned to condense the work into a shorter period of time in the summer term when there is more flexibility, particularly in secondary schools. Examples of both these structures will be included but the overall contact time with schools should be the same.

14b – Multiplicative reasoning model:

The tried and tested Work Group model follows a workshop gap task cycle consisting of 3 workshops followed in each case by a gap task.

- Each workshop will provide an opportunity for KS2 and KS3 teachers to study together some key ideas and approaches through exploring a set of researcher designed (and trialled) lessons which have extensive PD commentaries.
- This will then form the basis of a lesson study gap task which enables involvement of wider department.
- Subsequent workshops will provide important PD feedback opportunities on impact on learning observed in the lesson study Support of an HEI co leader is particularly beneficial here).

All the materials, resources and workshop plans will be provided (as they are based on the materials and approaches of the KS3 multiplicative reasoning project).

E. Work Group Lead requirements

Experience of leadership of maths in either a primary or secondary setting
Some experience of Teaching for Mastery so that key messages can be shared and are consistent with the NCETM programme

14b Multiplicative reasoning model:

- Work groups should be led by an experienced mathematics teacher/consultant who has led PD in their school or other schools (some experience of ‘lesson study’ would be useful)
- There will be an expectation that where possible the WGL should try out the lessons for themselves prior to presenting them at a workshop (support on the lessons will be given at WGL training days)
- Ideally where possible should be supported in the running of the workgroup by an appropriate HEI representative recruited by the hub from a local HEI.
- Where a WGL has previously been involved in running a MR WG from last year: provision will still be offered to support them with key aspects of the newly amended WG. This will probably be in the form of a requirement to attend 2 central WGL days (rather than 4 as is the case for new WGLs)

F. Work Group Lead support	
The online community will be there to address issues arising between face to face meetings and also to share successful ideas and strategies.	

What central workshops will there be for the Work Group Leads?

There will be 3 or 4 face to face days with Work Group Leads in 2018-19 as this has generated greater engagement than 2 days and online sessions in between. Hubs running more than one work group need only send one lead to the sessions. WG Leads running the project for the second time may be asked to share their experiences with new leads.

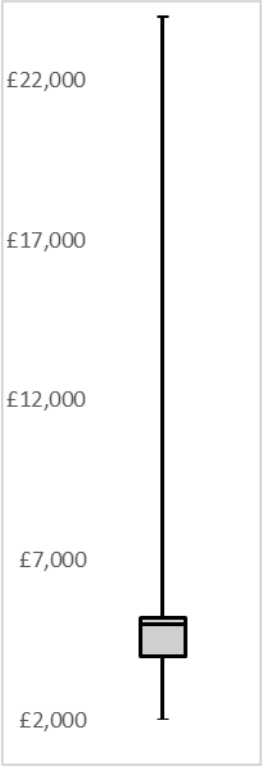
14b: MR: Access to the NCETM multiplicative reasoning microsite; workshops will include detailed opportunities to discuss the materials and listen to HEI researchers in this area of teaching and learning. There will also be expert HEI support for running lesson study feedback sessions.

Date (month)	Length	No. of venues	Key function of workshop	
			Model A	**Model B (MR)**
Sep 2018 ***Joint day 10a and 10b***	1 day	1	To share: • aims of the work group • organisational information • key points from the evaluation of the 2017-18 project • evaluation process for the 2018-19 work groups	
			• possible activities to use in the initial work group sessions will be shared.	Introduce project, materials – support lesson study – prepare for delivery of 1st hub workshop
Feb 2019	1 day	1	To share: • successes so far • examples of documentation produced in 2017-18 work groups • strategies for continuing engagement with schools • reminder of evaluation expectations and evidence collection	Introduce lesson set 2,– prepare for delivery of 2nd hub workshop
April 2018	1 day	1	N/A	Introduce project, materials – support lesson study – prepare for delivery of 3rd (final) hub workshop
June/July 2019 ***Joint day 10a and 10b***	1 day	1	NCP evaluation – a chance to spend time organising evidence, beginning the evaluation paperwork and deciding on next steps for the group	

G. Potential Work Group costs	
10a	**10b Multiplicative reasoning model**
7 days WGL time in total 3 days face to face sessions with work group schools as a whole group (could be half a day per half term) Venue costs for 3 whole day sessions/6 half day sessions	7 days WGL time (3 days face to face leading workshops and 4 days attending central WGL training) 3 days HEI support to leading participant workshops Venue costs for 3 workshop days spread over sept -

3 days for WGL to visit the work of the schools in the project 1 day WGL evaluation of the project	July

There were 37 NCP17-10 Work Groups in 2017-18 with median funding allocation by participating hubs of £5000.



Title	Challenging Topics at GCSE		
Phase	*KS3 & KS4*	**Strategic priority**	*2*
Stage	Development	**Project code**	**NCP18- 15**

A. Project summary

WGLs work on a single GCSE 'topic' with their groups, establishing what the issues are and what the common misconceptions are, how these might be addressed through activities and questioning which promote deeper thinking and how teaching in KS3 might be modified or utilised to improve understanding for this topic in KS4.

B. Project rationale

Within the 'old' GCSE there were a number of topics that consistently proved challenging for many teachers and their pupils for a variety of reasons, either that the content itself was perceived to have an inherently high level of challenge or that it was less difficult material but somehow proved difficult to teach in a way that made sense to pupils, resulting, at best, in an instrumental understanding.

With the new GCSE the list of challenging topics has actually changed little from previous years, and an evidence-based list of challenging topics arising in the new GCSE was drawn up with awarding bodies.

Nationally, Work Groups are set up to explore effective ways of teaching some of these topics, both to address the immediate needs of the incoming KS4 pupils, but also taking a longer term view by considering development in KS3. Each individual WG focuses on just one topic, but WG Leads will have access to the work and resources done by other groups.

This NCP has run for a year, but feels as if it has only scratched the surface. WG Leads might wish to continue in order to explore a new topic or to further develop the topic they have begun work on. Taking a single topic and really getting to grips with all the underpinning content, exploring misconceptions and effective pedagogical approaches for each element, is a massive undertaking.

C. Broad Work Group/Programme outcomes

Professional learning

Teachers to appreciate that it is important to look further back in the locus of teaching rather than 'fire-fighting' in KS4.

Teachers to analyse what it is about certain topics that makes them more challenging and be able to apply these analytical skills more widely in the curriculum.

Teachers to explore what it means for teaching to be 'effective' and how this might be evaluated in class and through assessment in all its forms.

Teaching and/or leadership practice

Teachers gaining a deeper understanding of the pre-requirements for teaching some of the challenging GCSE topics.

Whole school/departmental policies and approaches

It is intended that any resources created or shared and the analysis skills developed will be shared with departmental colleagues.

We hope there will be opportunities for teachers to raise and explore issues with their colleagues such as the order in which topics are taught, the different emphases placed on approaches and skills etc. but these are likely to vary for each school and with each challenging topic - and we are not in a position to anticipate what these might be, nor yet to report on what has happened this year.

Pupil achievement, attitudes, participation or experience

Pupils will be involved to a high degree within this Work Group as their teachers will need to explore misconceptions and try to ascertain what it is about certain topics that makes them challenging as well as trying out teaching materials and approaches.
A wide range of pupils will be exposed to different activities and their views sought about how each has contributed to their understanding as well as taking part in assessment activities which will expose their misconceptions.
The intention is that pupils will become more confident in their own skills and abilities, developing a deeper and more connected understanding of prior content thus enabling them to better tackle the challenging topics.

D. Work Group models

One WG model, but some variation possible within this.

The intention is to develop a deep understanding for one topic in preference to a superficial understanding of several topics. The strategies employed when focusing on this one topic can then be used independently for additional topics at a later date or within the participant's own time

Each WG Lead attends 3 central Workshops
Each WG Lead plans and leads 4 – 6 Workgroup sessions, which could be ½ a day or a full day each. Costed structure below is 1 full day followed by 3 half days, but if recruitment is difficult, a reduced model could be used. Evaluation from this year should give some guidance about the relative strengths and weaknesses of different timing structures.

Central modelling of the types of sessions and activities that could be used for a selected topic which WG leads then translate into sessions for their selected topic.

WG Leads work in small groups to share ideas and plans for sessions for their selected topic; to be able to contribute to the planning for their topic they *must* have experience of leading CPD, although amongst the WG Leads there is likely to be a range of experience and so this aspect is also developmental for the WG Leads.

Each WG consists of approximately 4 schools, ideally with 2 teachers attending from each school.
MHs could make funding available to cover their release time.

E. Work Group Lead requirements

One WG Lead required.

Experienced PD lead.
Experience of teaching KS3 and KS4 maths, but may or may not be teaching currently.

F. Work Group Lead support

What central workshops will there be for the Work Group Leads?			
Date	Length	No. of	Key function of workshop

(month)		venues		
			New WG Lead	Existing WG Lead
Oct/Nov	1 day	1	Determine content to be researched and establish sub-groups Exemplify approach to one topic Set out ways of working with WGs Begin to understand ways of evaluating 'effectiveness'	Programme t.b.c. depending on numbers. Update on data from recent GCSE exams. Examining effective PD approaches. Leading a sub-group. Exploration of resources and approaches.
Jan/Feb	1 day	1	Explore different approaches to evaluating outcomes within a classroom. Sub-group planning	
June/ July	1 day	1	Disseminate outcomes for each of the sub-groups, which will include materials as well as teaching loci which can be used by others. In this way, although each subgroup will only have explored one topic in depth, they will have plans and materials for 4-6 focus topics.	

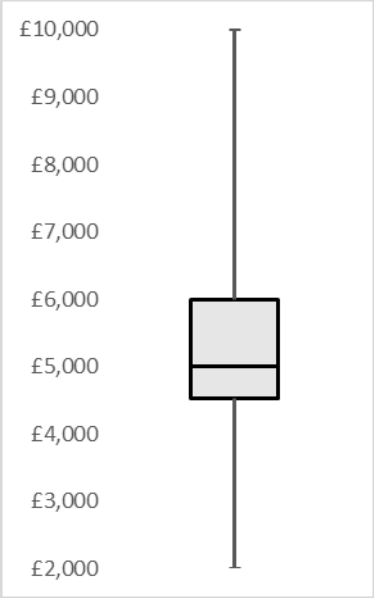
G. Potential Work Group costs

WG Leads 9 days
Already has experience in leading CPD as they will need to contribute to session planning and resource evaluation and development.
Strong background in teaching both KS3 and KS4 pupils.

Activity	**Cost**	**Time**
Attending WG Lead days	£600	3 days
Planning each WG session 1 day + 3 half days	£875	2.5 days
Leading each WG session 1 day + 3 half days	£875	2.5 days
Evaluation	£350	1 day
Total	**£2700**	**9 days**

Also consider bursaries for teachers attending if recruitment is an issue.

There were 29 NCP17-12 Work Groups in 2017-18 with median funding allocation by participating hubs of £5000.



Title	Supporting Post-16 GCSE Resit		
Phase	*Post 16*	**Strategic priority**	*2*
Stage	Development	**Project code**	**NCP18-16**

A. Project summary

To explore effective ways of teaching key content to GCSE resit students.
To explore effective ways of working with teachers of post-16 resit GCSE, predominantly in FE colleges.

B. Project rationale

Continuation of Maths Hubs NCP17-18 from 17/18 with a longer-term view of partnership working with FE Centres of Excellence as they emerge in the coming months.

- Large and growing number of Post-16 GCSE Resit students, predominantly in FE colleges.
- New GCSE (now in second year) is still unfamiliar to many teachers in FE Colleges and Sixth Form Colleges.
- Timeframe for resit delivery over 8 months rather than two (or more) years.
- Smith Review report recommendations 5, 7 and 8.
- Post-16 GCSE Resit is a condition of funding for students with 3 or D previously.
- The pass rate for GCSE Mathematics as a resit is low, and is lower than for resit GCSE English.

C. Broad Work Group/Programme outcomes

Professional learning

- Develop knowledge and understanding of the curriculum demands of the revised GCSE (i.e. and improved awareness of the GCSE qualification structure, themes, content and issues).
- Increased awareness and effective use of pedagogical approaches that facilitate student access of the revised curriculum (including an increased awareness of and effective use of existing good resources and teaching approaches; e.g. use of bar modelling and application to GCSE topics).
- Increased understanding of ways of working within this sector.

Teaching and/or leadership practice

- Develop teaching and learning approaches/pedagogy promote student engagement with the revised curriculum.
- Develop teachers' confidence and competence in teaching the new GCSE as a resit in Post-16 (often limited to an 8-month course).

Whole school/departmental policies and approaches

- Sharing of practice and resources which are effective with this group of students (e.g. through SoW, CPD, collaborative planning), so that these approaches become embedded as departmental practice.
- Increased localised support and collaboration with 11-16 schools.
- Use of gap tasks/ TRG style meetings to model and disseminate research and practise.

Pupil achievement, attitudes, participation or experience

- Increased pupil engagement and conceptual understanding; in particular capacity to engage with non-standard problems.
- Improved pupil outcomes at GCSE.

D. Work Group models

Rationalisation of models of activity from 17/18 into a small number of themes in 18/19. 17/18 evaluation will inform which themes and models of activity within these themes go forward to 18/19. These themes/models will be available to newly participating hubs in 18/19 as well as those already participating in 17/18 who wish to continue in 18/19.

E. Work Group Lead requirements

Indicative requirements:-

a) Expertise experience – PD Lead, experience of teaching new GCSE and Post-16 GCSE resit students, ideally in a FE/Sixth Form college context.
b) Current role – leading PD in own college/school context or more widely, teaching new GCSE and Post-16 GCSE resit students, knowledge of FE context of 85% of GCSE resit students.
c) Commitment – 3 days national support workshops + 12 days Work Group related activity = 15 days total.
d) Generally, one WGL per Work Group but potential for major lead and minor lead working together.

F. Work Group Lead support

National support workshops for Work Group Leads (x3) in a central location venue sourced and funded by Maths Hubs Network.
Pre-developed Work Group models going forward from 17/18.
Mutual support from other project WGLs, PCT and NCETM via project on-line community.

What central workshops will there be for the Work Group Leads?

Date (month)	Length	No. of venues	Key function of workshop
September/ October	1 day	1	18/19 NCP17-QQ launch and WGL training. Rationale, intended outcomes, model(s) of activity, expectations for evaluation and reporting.
January/ February	1 day	1	Progress to date, emerging good practice and issues, initial evaluation to inform planning for 19/20.
April/May	1 day	1	Evaluation of 18/19 and looking ahead to 19/20.

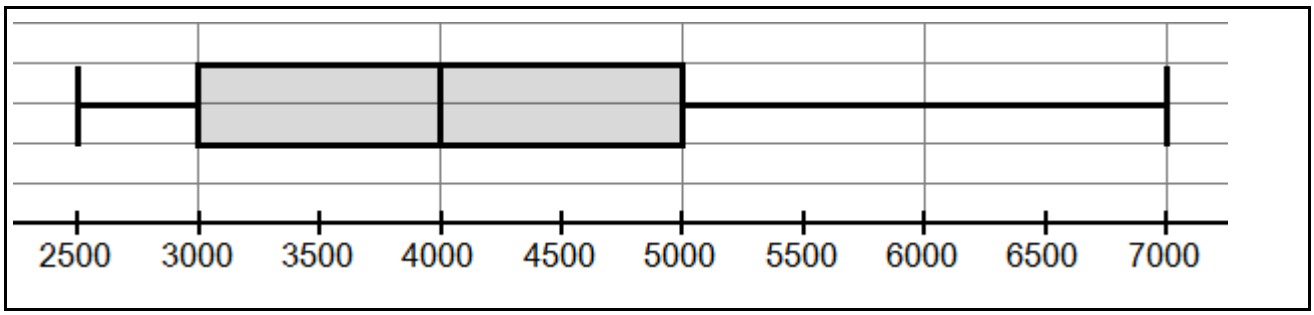
G. Potential Work Group costs

Recommendation of a minimum of £5000 funding allocation by participating hubs in 18/19.

Indicative costings (low end):-
WGL time: planning = 3 days, WG workshops = 3 days, in school activity = 3 days, evaluation = 3 days.
Total 12 days @£200 = £2400.
WG venues/refreshments: model dependent = 3 or 4 WG meetings per year £1000.
Resources: £400.
Grants to participating schools/colleges: £0.
National support workshops: travel 3 x £100 = £300; cover 3 x £200 = £600. Total = £900.
Grand total: £2400 + £1000 + £400 + £0 + £900 = £4700.

Indicative costings (high end):-
WGL time: planning = 3 days, WG workshops = 3 days, in school activity = 3 days, evaluation = 3 days.
Total 12 days @£300 = £3600.
WG venues/refreshments: model dependent = 3 or 4 WG meetings per year £1000.
Resources: £400.
Grants to participating schools/colleges: £0.
National support workshops: travel 3 x £100 = £300; accommodation 3 x £100 = £300; cover 3 x £300 = £900. Total = £1500.
Grand total: £3600 + £1000 + £400 + £0 + £1500 = £6500.

There were 20 NCP17-18 Work Groups in 17/18 with median funding allocation by participating hubs of £4000.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Title	Supporting Core Maths		
Phase	*Post 16*	**Strategic priority**	*Priority 6**
Stage	Development	**Project code**	**NCP18-17**

A. Project summary

- National support for the development of participation in Core Maths through enabling teachers to develop teaching approaches through collaboration.
- Direct working partnership between the Maths Hubs network and the Advanced Mathematics Support Programme (AMSP).

B. Project rationale

Continuation and extension of Maths Hubs NCP17-20 from 17/18 in partnership with the AMSP.

- All schools and colleges have a responsibility to prepare students for the modern workforce and the needs of their wider lives.
- Students with a GCSE 4+ who do no maths in Years 12 and 13 often need maths at university or in their careers.
- Many schools/colleges need effective, pedagogical and economical support to embark on this new qualification.
- Collaboration yields innovation and progress; hence a collaborative support package is effective.
- Using the experience of others who have gone through the process to guide new entrants is a tried and trusted approach.
- Local support is accessed more frequently and easily.
- Smith Review Report recommendations 1, 2 and 9.
- The introduction of the Advanced Mathematics Premium from September 2018 is likely to result in increased demand for Core Maths in the coming years.

C. Broad Work Group/Programme outcomes

Professional learning

- Participants will understand the philosophy of Core Maths, with its approach to maths through contextualised problem-solving.
- Participants will appreciate the different Core Maths courses and be able to choose the one appropriate for their students.

Teaching and/or leadership practice

- Participants will effectively teach mathematical concepts and processes through contextualised problem-solving.
- Participants will lead others in their own department to ensure an effective delivery of the course.
- Participants will promote and deliver a Core Maths course in a way that engages qualified students.
- Participants will work collaboratively with other institutions using a school to school support model.
- Participants will make effective and exhaustive use of the existing Core Maths resources.

Whole school/departmental policies and approaches

- The whole school mathematics policy of establishing Level 3 mathematics pathways will be supported.
- Maths teaching capacity and quality across the school/college will have been improved.
- The school/college will have clear ways of communicating and promoting its Core Maths offer.
- Support senior leadership in understanding the benefits of Core Maths.
- Support the role of Core maths in promoting problem solving and links to GCSE.

Pupil achievement, attitudes, participation or experience

- Increased student participation in Core Maths.

- Participating students will have greater appreciation of relevance of maths to their lives.
- Students will have increased their confidence in using maths.
- Students will have performed better in the mathematical demands of other subjects.

D. Work Group models

It is essential that Maths Hubs engage in regional discussions to decide on participation in Core Maths Work Groups across a region. It is likely that the AMSP will fund 18 Core Maths Work Groups in Maths Hubs in 18/19 and it is anticipated that these will run in around half of the Maths Hubs in a region alongside significant additional AMSP support for Core Maths in other formats across the country.
There will be a rationalisation of models of activity from 17/18 informed by both 17/18 evaluation of Maths Hubs activity and discussion with the AMSP. The precise local plan, including Work Group leadership, will be developed by hubs and the AMSP in collaboration.

E. Work Group Lead requirements

Indicative requirements:-

- Expertise/experience – strong knowledge of Core Maths philosophy, pedagogy and qualifications, experience of teaching Core Maths, knowledge of Post 16 context and Level 3 pathways.
- Current role – existing 17/18 NCP17-20 WGL, CMSP RA, CMSP CML, Core Maths Early Adopter, Core Maths Early Developer, PD Lead, AMSP Central Team, AMSP Area Co-ordinator, leading Core Maths teaching/PD in own college/school context or more widely, teaching Core Maths.
- Commitment – 3 days national support workshops + 12 days Work Group related activity = 15 days total.
- Generally, one WGL per Work Group but potential for major lead and minor lead working together.

F. Work Group Lead support

National support and new resources from the AMSP.
Collaborative planning of NCP18-RR Work Groups in each participating Maths Hub in partnership with the AMSP.
National support workshops for Work Group Leads (x 3) in a central location or locations – venues sourced and funded by the Maths Hubs Network.
Existing quality assured Core Maths teaching resources via the National STEM Learning website.
Mutual support from other project WGLs, Maths Hubs PCT, NCETM and AMSP via project on-line community and webinars.

What central workshops will there be for the Work Group Leads?

Date (month)	Length	No. of venues	Key function of workshop
September/ October	1 day	1	18/19 NCP18-RR launch and WGL training. Rationale, intended outcomes, model of activity, expectations of partnership working, evaluation and reporting.
January/ February	1 day	1	Progress to date, emerging good practice and issues, initial evaluation to inform planning for 19/20.
April/May	1 day	1	Evaluation of 18/19 and looking ahead to 19/20.

G. Potential Work Group costs

Work Group funding for 18/19 is yet to be finalised by the Maths Hubs network and the AMSP.

The AMSP are likely to fund 18 Work Groups of 15 participant teachers across 9 regions comprising 3 workshop days to include leadership (£1000 per Work Group) and venue and refreshments (£1000 per Work Group) and totalling £2000 per Work Group.

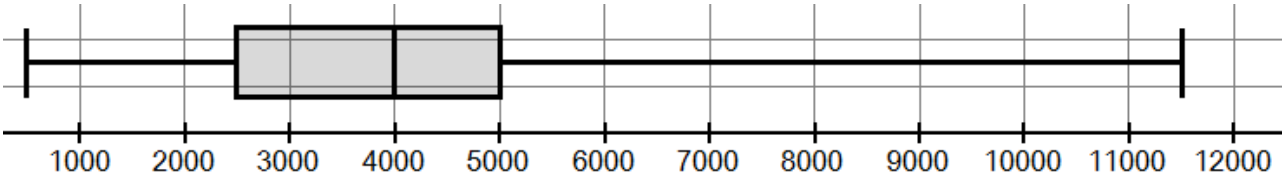
There may be other aspects of Work Group activity that require funding input from Maths Hubs (see below).

Recommendation of a minimum of £5000 total funding allocation per Work Group in 18/19.

Indicative costings (low end):-
WGL time: planning = 3 days, WG workshops = 3 days (AMSP), in school activity = 3 days, evaluation = 3 days. Total 12 days @£200 = £2400.
WG venues/refreshments: model dependent = 3 WG meetings per year £1000 (AMSP).
Resources: £400.
Grants to participating schools/colleges: £0.
WGL attendance at national support workshops: travel 3 x £100 = £300; cover 3 x £200 = £600. Total = £900.
Grand total: £2400 + £1000 + £400 + £0 + £900 = £4700.

Indicative costings (high end):-
WGL time: planning = 3 days, WG workshops = 3 days, in school activity = 3 days, evaluation = 3 days. Total 12 days @£300 = £3600.
WG venues/refreshments: model dependent = 3 WG meetings per year £1000.
Resources: £400.
Grants to participating schools/colleges: £0.
WGL attendance at national support workshops: travel 3 x £100 = £300; accommodation 3 x £100 = £300; cover 3 x £300 = £900. Total = £1500.
Grand total: £3600 + £1000 + £400 + £0 + £1500 = £6500.

There were 25 NCP17-20 Work Groups in 17/18 with median funding allocation by participating hubs of £4000.



Title	Embedding Technology in A Level Teaching		
Phase	*Post 16*	**Strategic priority**	*Priority 6**
Stage	Development	**Project code**	**NCP18-18**

A. Project summary

- National support for the effective embedding of technology in the teaching of A Level Mathematics and/or Further Mathematics to enhance teaching and conceptual understanding of students.
- Direct working partnership between the Maths Hubs network and the Advanced Mathematics Support Programme (AMSP).

B. Project rationale

Continuation and extension of Maths Hubs NCP17-21 from 17/18 in partnership with the AMSP.

- There is a range of currently available mathematics teacher PD around specific technology skill development and application to teaching but little evidence of sustainable, widespread embedding of technology in teaching and learning in all A level mathematics classrooms.
- DfE 2017 A Level Content states “The use of technology, in particular mathematical and statistical graphing tools and spreadsheets, must permeate the study of AS and A level mathematics.”
- Smith Review Report Recommendation 14: The DfE should seek to improve the evidence base on the role and effectiveness of technology in the teaching of 16-18 mathematics.

C. Broad Work Group/Programme outcomes

Professional learning

- Knowledge of where, when and how to use technology to enhance understanding/learning/experience
- Confidence and competence to use pre-prepared applications of technology.
- Confidence to develop own technology skills and further embed the appropriate and effective use of technology.

Teaching and/or leadership practice

- Embedding the appropriate and effective use of technology and the study of the new linear A-Level Mathematics.
- Sign-posting to resources; linkage to SoWs
- Identification of previous research reports.

Whole school/departmental policies and approaches

- Use of technology within teacher CPD as well as classrooms
- Use of lesson study / TRG style meetings to model practise and research impact.
- Change in whole department sustained / embedded use of technology

Pupil achievement, attitudes, participation or experience

- Improved conceptual understanding and engagement with mathematics through technology.

D. Work Group models

It is essential that Maths Hubs engage in regional discussions to decide on participation in A Level Technology Work Groups across a region. It is likely that the AMSP will fund 18 Embedding Technology Work Groups in Maths Hubs in 18/19 and it is anticipated that these will run in around half of the Maths Hubs in a region alongside significant additional AMSP support for A Level Mathematics and Further Mathematics teaching in other formats across the country.

There will be a rationalisation of models of activity from 17/18 informed by both 17/18 evaluation of Maths Hubs activity and discussion with the AMSP. The precise local plan, including Work Group leadership, will be developed by hubs and the AMSP in collaboration.

E. Work Group Lead requirements

Indicative requirements:-

- Expertise/experience – strong knowledge and experience of the use of technology to support teaching of A Level Mathematics or Further Mathematics, strong knowledge of A Level Mathematics/Further Mathematics pedagogy and qualifications, experience of teaching new 2017 A Level Mathematics/Further Mathematics.
- Current role – existing NCP17-21 WGL, PD Lead, AMSP Central Team, AMSP Area Co-ordinator, championing use of technology in A Level Mathematics or Further Mathematics teaching in own department or more widely, leading A Level Mathematics or Further Mathematics teaching/PD in own college/school context or more widely, teaching A Level Mathematics or Further Mathematics.
- Commitment – 3 days national support workshops + 12 days Work Group related activity = 15 days total.
- Generally, one WGL per Work Group but potential for major lead and minor lead working together.

F. Work Group Lead support

National support and new resources from the AMSP.
Collaborative planning of NCP18-SS Work Groups in each participating Maths Hub in partnership with the AMSP.
National support workshops for Work Group Leads (x 3) in a central location or locations – venues sourced and funded by the Maths Hubs Network.
Existing quality assured technology teaching resources via the AMSP and MEI.
Mutual support from other project WGLs, Maths hubs PCT, NCETM and AMSP via project on-line community and webinars.

What central workshops will there be for the Work Group Leads?

Date (month)	Length	No. of venues	Key function of workshop
September/ October	1 day	1	18/19 NCP18-SS launch and WGL training. Rationale, intended outcomes, model of activity, expectations of partnership working, evaluation and reporting.
January/ February	1 day	1	Progress to date, emerging good practice and issues, initial evaluation to inform planning for 19/20.
April/May	1 day	1	Evaluation of 18/19 and looking ahead to 19/20.

G. Potential Work Group costs

Work Group funding for 18/19 is yet to be finalised by the Maths Hubs network and the AMSP.

The AMSP are likely to fund 18 Work Groups of 10 participant teachers across 9 regions comprising 3 workshop days to include leadership (£1000 per Work Group) and venue and refreshments (£1000 per Work Group) and totalling £2000 per Work Group.

There may be other aspects of Work Group activity that require funding input from Maths Hubs (see below).

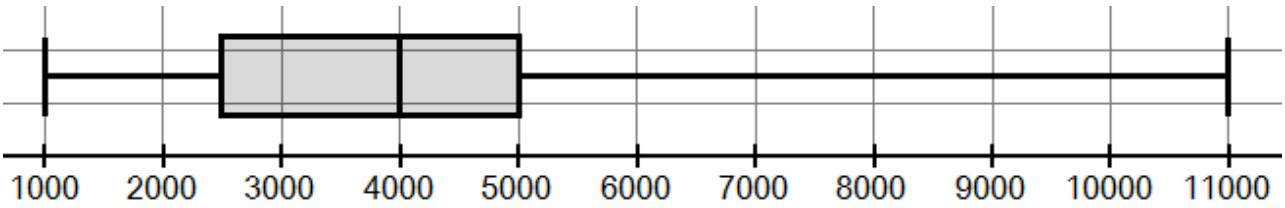
Recommendation of a minimum total of £5000 total funding allocation in 18/19.

Indicative costings (low end):-
WGL time: planning = 3 days, WG workshops = 3 days (AMSP), in school activity = 3 days, evaluation = 3 days. Total 12 days @£200 = £2400.

WG venues/refreshments: model dependent = 3 WG meetings per year £1000 (AMSP).
Resources: £400.
Grants to participating schools/colleges: £0.
WGL attendance at national support workshops: travel 3 x £100 = £300; cover 3 x £200 = £600. Total = £900.
Grand total: £2400 + £1000 + £400 + £0 + £900 = £4700.

Indicative costings (high end):-
WGL time: planning = 3 days, WG workshops = 3 days (AMSP), in school activity = 3 days, evaluation = 3 days. Total 12 days @£300 = £3600.
WG venues/refreshments: model dependent = 3 WG meetings per year £1000 (AMSP).
Resources: £400.
Grants to participating schools/colleges: £0.
National support workshops: travel 3 x £100 = £300; accommodation 3 x £100 = £300; cover 3 x £300 = £900. Total = £1500.
Grand total: £3600 + £1000 + £400 + £0 + £1500 = £6500.

There were 23 NCP17-21 Work Groups in 17/18 with median funding allocation by participating hubs of £4000.



Title	Supporting A Level Teaching		
Phase	*Post 16*	**Strategic priority**	*Priority 6**
Stage	Development	**Project code**	**NCP18-19**

A. Project summary

- National support for the development of the quality of teaching in A Level Mathematics and Further Mathematics in school and college departments.
- Direct working partnership between the Maths Hubs network and the Advanced Mathematics Support Programme (AMSP).
- Funded and led by the AMSP supported by Maths Hubs in relation to location and recruitment.

B. Project rationale

New NCP in partnership with the AMSP.

- Targeting school/college departmental development needs and those of teachers in these departments.
- Flexible attendance by individual teachers from departments based on need.
- Potential to target areas of low engagement with support activity.

C. Broad Work Group/Programme outcomes

Professional learning

- know the content and requirements of the new A level Mathematics
- understand the purpose of the overarching themes
- be confident in teaching new aspects of content (particularly mechanics and statistics) for the first time
- believe in the benefits of teaching statistics through the use of large data sets and promoting the overarching themes throughout their teaching

Teaching and/or leadership practice

- plan sequences of lessons which meet the requirements of the new A level
- raise awareness in students to the links between mathematical topics within the new A level content
- support colleagues in their own schools/colleges in embedding themes from the course in their planning for the new A level
- use real-world data to support the learning of Statistics with a large data set.

Whole school/departmental policies and approaches

Schools/colleges will have improved the capacity of staff to deliver A level Mathematics, and they will be able to prepare lessons that meet the requirements of the new A level.

Pupil achievement, attitudes, participation or experience

Pupils will engage with the three overarching themes of the new A level and so have a more joined up view of the subject and be better prepared for the new style of exams.

D. Work Group models

It is essential that Maths Hubs engage in regional discussions to decide on participation in A Level Teaching Work Groups across a region. It is likely that the AMSP will fund 9 A Level Teaching Work Groups in collaboration with Maths Hubs in 18/19 and it is anticipated that these will run in around a quarter of Maths Hubs across the country alongside significant additional AMSP support for A Level teaching in other formats across the country.
The precise local plan, including Work Group leadership, will be developed by hubs and the AMSP in collaboration.
The model includes 4 days that are ‘stand-alone’ and themed. A department could access one, more than

one or all of the days. An individual teacher in a department could attend one, more than one or all of the days. Different teachers from the same department could attend different days.

E. Work Group Lead requirements

Led by AMSP.
Indicative requirements:-

- Expertise/experience – strong knowledge of A Level Maths philosophy, pedagogy and qualifications, experience of teaching A Level Maths.
- Current role – experienced Maths Hub WGL, PD Lead, AMSP Central Team, AMSP Area Co-ordinator, leading A Level teaching/PD in own college/school context or more widely, teaching A Level Maths.
- Commitment – 1 day training + 4 days Work Group related activity = 5 days total.
- Generally, one WGL per Work Group but potential for major lead and minor lead working together.

F. Work Group Lead support

National support and resources from the AMSP.
Training for Work Group Leads (x 1) in a central location – venue sourced and funded by the AMSP.
Mutual support from other project WGLs, Maths Hubs PCT, NCETM and AMSP via project on-line community and webinars.

What central workshops will there be for the Work Group Leads?

Date (month)	Length	No. of venues	Key function of workshop
September/ October	1 day	1	18/19 NCP18-RR launch and WGL training. Rationale, intended outcomes, model of activity, expectations of partnership working, evaluation and reporting.

G. Potential Work Group costs

Work Group funding for 18/19 is yet to be finalised by the Maths Hubs network and the AMSP.

It is likely that this Work Group will be entirely funded by the AMSP with either no or low costs to Maths Hubs budgets.

The AMSP are likely to fund 9 Work Groups of 10 participant departments across 9 regions comprising 4 workshop days to include leadership (from AMSP) and venue and refreshments (£1400 per Work Group).

There may be other aspects of Work Group activity that require funding input from Maths Hubs (see below).

- Additional administration
- Recruitment of participants
- Evaluation activity

Title	Primary SKE		
Phase	Primary	**Strategic priority**	7
Stage	Development	**Project code**	**NCP18-20**

A. Project summary

To develop Subject Knowledge for primary teachers to enable them to understand, teach and support pupils in mathematics in the classroom.
This is a continuation of NCP17-14; this year there will be a move to greater consistency in content and pedagogy to link with TfM. The aim is to move to a Maths Hub SKE Programme for effectiveness stage in 2019-20. Work Group plans and activities will be expected to include key core content and pedagogy. Resources for this content will be provided to support Work Group Leads in a consistent approach, although they can be adapted to suit the needs of local WGLs or participants.

B. Project rationale

What is the evidence/case for work in this area?

(1) Evidence from research of improvements from SKE programmes

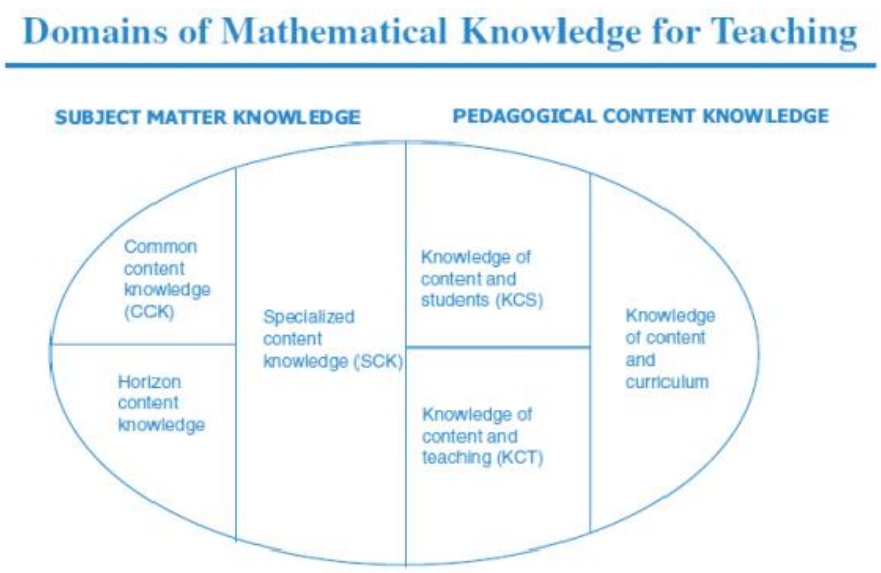
Seabourne (2006) found that SKE courses led to “improvements in subject knowledge, attitude, understanding and confidence” and that student evaluations found an “awareness of the importance of understanding the subject in depth and making connections; the value of collaborative working; enjoyment of engagement in mathematical activity”

(2) Evidence from Maths Hubs of improvements from SKE programmes

Evaluations from 2016-17 provide qualitative evidence that the SKE programmes run by hubs are having an impact in the classroom and on pupil achievement. Evaluations from 2017-18 are still anecdotal but there is evidence of impact and we know that schools are asking maths hubs to continue to run these Work Groups.

(3) There is a need to improve both subject matter knowledge and pedagogical content knowledge.

For the Teaching for Mastery programme to be successful it is important that all primary school teachers have a deep subject knowledge and appropriate pedagogy. Maths hubs are well placed to work within the school and PD system to help ensure these programmes are of high quality; and to support the training for CPD providers in delivering the programmes. They can also work to ensure that the programme content maintains fidelity with the Shanghai approach and complements the work being done by the Mastery Specialists.
Ball, Thames and Phelps (2008) create the following helpful classification of mathematical knowledge for teaching.



C. Broad Work Group/Programme outcomes
Professional learning A key focus needs to be on not only improving the participants' ability to "do" mathematics but also to ensure they have the appropriate pedagogical knowledge to teach their pupils well. Subject knowledge needs to be linked to pedagogy. Teachers' will develop their knowledge about mathematics and knowledge about the teaching of mathematics. In terms of the domains of mathematical knowledge (See diagram above) there will be improvements in Common Content Knowledge and Specialized Content Knowledge. These will link to better pedagogy so that teachers are aware of how pupils learn and how to teach the content most effectively. Core content across all the Work Groups, supported by slides and guidance notes, will ensure consistency with the pedagogy associated with the Teaching for Mastery programme. Teachers will develop enhanced mathematics subject knowledge with a particular emphasis on mathematical structures in key areas of mathematics
Teaching and/or leadership practice Classroom practice develops through a series of gap tasks where teachers try out activities to promote depth of understanding, reasoning and fluency; these might include pupil interviews, lesson study and work scrutinies. Research and evidence that support these areas is used to inform their practice and teachers are encouraged to share these more widely in schools to support discussion on current policies and approaches. Teachers develop an "all can achieve" mindset as they realise that with the teaching for mastery approach children have time to grasp concepts and explore them in more depth. Impact on classroom practice would include changes in and a focus on: • planning for learning, • teaching for learning, • assessing learning
Whole school/departmental policies and approaches The programme will have an impact on year group planning and increased use of manipulatives and representations. School calculation policies and lesson planning formats may be looked at with a view to ensuring that teaching for mastery and coherence are consistent across these. This also deepens teachers

understanding of how to design their lessons to include better questioning and more opportunities for mathematical talk.

An ambition is to have professional learning processes embedded in the schools. There should be a sustainable PD cycle for teachers that is more school based and less reliant on courses and input from external providers.

All those teaching mathematics should have a personalised plan that identifies the key opportunities needed to develop their subject specialist knowledge throughout their career

(ACME 2016)

Pupil achievement, attitudes, participation or experience

Increased pupil understanding of mathematics based around a consistency of methodology and teaching for mastery principles.

Pupils develop a deep understanding of the mathematical ideas they are taught so that they fully meet the aims of the National Curriculum (i.e. fluency, reasoning and problem solving)

Pupils will benefit from increased opportunities to explore concepts in more depth, and to develop a greater understanding of the connections in mathematics. They will be more confident in their mathematics and be able to explain their reasoning using appropriate language. Enjoyment and motivation to succeed will be seen in the classroom.

D. Work Group models

Maths hubs will have a choice of model:

a) Use a programme available from another hub to see if it is scalable through a train-the-trainer model
b) Develop or continue with your own programme. This must now include key core elements from central project team – guidelines and core slides will be provided that can be adapted to suit local participants and Work Group Leads

E. Work Group Lead requirements

Work Group Leads should have expertise and previous experience in the phase to which they are delivering. Ideally WGL would also be an NCETM Accredited PD Lead. There is a requirement to adapt current plans to include the core content. If using a model from another hub then WGLs should be willing to attend train-the-trainer days provided by the host hub.

F. Work Group Lead support

- NCETM Community holds central documents, plans and discussion threads
- Slides and guidance on core content will be presented in June 2018 for comment; final versions will be available prior to the September Workshop
- Webinars at intervals throughout the year to update WGLS and discuss the core content resources
- 1 day optional Train-the-Trainer models from participating hubs will be set up for WGLs who want to adopt a model that is felt to be ready for this stage. These would be run on an “at-cost” basis.

What central workshops will there be for the Work Group Leads?

Date (month)	Length	No. of venues	Key function of workshop
September 2018	1	1	Introduce core content, pedagogy and guidance Explain the evaluation process and introduce learning logs

			Look at possible hub models and train-the-trainer models Time to discuss and adapt planning to meet consistency criteria
June 2019	1	1	Focus on evaluation and next steps in developing a Maths Hub SKE programme

G. Potential Work Group costs
2017-18 Work Groups were in the range £2500 to £6000 depending on the number of sessions, and number of centres where the WG was held. Train the trainer day – if chosen – 1 day + travel+ host hub costs to cover basic venue and refreshments at cost Venues, resources and refreshments

Title	Teaching Assistant SKE		
Phase	Primary, Secondary	**Strategic priority**	7
Stage	Development	**Project code**	**NCP18- 21**

A. Project summary

To develop Key Stage specific Subject Knowledge for Teaching Assistants to enable them to support and/or deliver mathematics in the classroom or in small intervention groups. Participants might work in any Key Stage from Early Years to secondary.
This is a continuation of NCP17-15; in 2018-19 there will be a move to greater consistency in content and pedagogy to link with Teaching for Mastery. The aim is to develop a Maths Hub TA SKE Programme for effectiveness stage 2019-20.

B. Project rationale

There is demand within hubs for this Work Group for both primary and secondary phases, as well as SEND. There is generally little training in schools targeted at TAs, far less subject specific professional development. Yet well-trained and deployed teaching assistants is one of the key features identified for outstanding teaching and learning (20 outstanding primary schools – excelling against the odds – Ofsted 2009) The content demand varies with each cohort of TAs , but currently there are many adults working in classroom support for whom developing the confidence to support children in the maths classroom is a priority. Although many adults understand the value of number sense, they are not confident in their knowledge of how to ensure students understand these concepts deeply. Many adults will fall back on 'quick wins' and mistake this for good progress. This becomes more apparent as students get older.

"The typical deployment and use of TAs, under everyday conditions, is not leading to improvements in academic outcomes ….. Those pupils receiving the most support from TAs made less progress than similar pupils who received little or no support from TAs. There was also evidence that the negative impact was most marked for pupils with the highest levels of SEN, who, as discussed, typically receive the most TA support.

Key Recommendations:

1. TAs should not be used as an informal teaching resource for low-attaining pupils
2. Use TAs to add value to what teachers do, not replace them
3. Use TAs to help pupils develop independent learning skills and manage their own learning
4. Ensure that TAs are fully prepared for their role in the classroom
5. Use TAs to deliver high-quality one-to-one and small group support using structured interventions
6. Adopt evidence-based interventions to support TAs in their small group and one-to-one instruction

(Making the best use of Teaching Assistants, EEF, 2015)

Hubs and other organisations have already been working in this area with some effective practice being demonstrated. 2017-18 Work Groups will be evaluated and lessons learned used to inform practice in 2018-19. Maths hubs are well placed to work within the school and PD system to help ensure these programmes are of high quality; and to support the training for CPD providers in delivering the programmes.

This is a Work Group that can be scaled up for delivery beyond the maths hub network.

C. Broad Work Group/Programme outcomes

Professional learning

To develop Teaching Assistant's knowledge about mathematics and the teaching of mathematics. In 2018-

19 every Work Group will include core content in terms of subject knowledge and associated pedagogy which supports understanding of the connections in mathematics and the principles that support teaching for mastery.

- The skills and confidence of Intervention Assistants working students will be improved.
- Knowledge of the pedagogy of maths teaching and ways of relating this to small group teaching.
- Understanding how children think and where their misconceptions stem from
- A greater awareness of the three aims of the National Curriculum (fluency, reasoning and problem solving) and to understand how these aims relate specifically to the teaching of calculation and the development of pupils' arithmetic proficiency.
- Understand the role that certain representations, models and manipulatives can play in the development of pupils' understanding of number and calculation particularly place value and proficiency in the use of efficient standard algorithms for each of the four operations.
- Develop an understanding of the interplay between conceptual understanding and procedural fluency and to understand how each contribute to the achievement of mastery of the curriculum.

Teaching and/or leadership practice

There is no requirement for TAs to teach classes, but they need to get better at ways of working within classes or when withdrawing pupils from class. For example, 1-1, small group, diagnostic intervention, carrying out pupil interviews.

The specific content might include approaches to enhance practical applications of the skills and knowledge developed during the course.

Discussion of ways TAs are deployed – might lead to more effective use in schools
Possible for maths coordinator to be involved more in these programmes – to ensure there is more likelihood of ongoing professional development for TAs after the WG

The wider impact of this Work Group could include

- encouraging TAs to talk to others about the training they have received
- encouraging classroom teachers to use methods they are trained on, such as the use of concrete resources
- giving TAs a higher status within the school setting.
- discouraging the use of quick fixes and enhancing the correct use of mathematical language.

Whole school/departmental policies and approaches

Supports departmental intervention and further supports strategies. Helps to develop a positive attitude towards mathematics.
The programmes could support the introduction of an intervention programme back in school, with an ambition that development work for TAs would be coordinated internally by maths leads.

We will be promoting an ongoing model for professional learning for TAs which is predominantly school based rather than having to "go on a course". This would ensure that the focus remained on the needs of the students in the school they are working in and practical applications are easily tried and evaluated.

Pupil achievement, attitudes, participation or experience

With better support lower attaining students will develop a deeper understanding of their mathematics, which will lead to greater confidence and positive mind sets.

The programme we develop should improve outcomes for students, but this is very difficult to quantify unless running an intervention programme with suitable pre- and post- testing.

A focus on familiarisation with manipulatives, representations and the principles of teaching for mastery will enable TAs to better support all students in deeper understanding of connections between areas of mathematics.

D. Work Group models

Maths hubs will have a choice of model:

c) Use a programme available from another hub to see if it is scalable through a train-the-trainer model
d) Develop or continue with your own programme. This must now include key core elements from central project team – guidelines and core slides will be provided that can be adapted to suit local participants and Work Group Leads

E. Work Group Lead requirements

Work Group Leads should have expertise and previous experience in the phase to which they are delivering. Ideally WGL would also be an Accredited PD Lead. There is a requirement to adapt current plans to include the core content. If using a model from another hub then WGLs should be willing to attend train-the-trainer days provided by the host hub.

F. Work Group Lead support

- NCETM Community holds central documents, plans and discussion threads
- Slides and guidance on core content will be presented in June 2018 for comment and final versions available prior to the September Workshop
- Webinars at intervals throughout the year to update WGLS and discuss the core content resources
- One day optional Train-the-Trainer models from participating hubs will be set up for WGLs who want to adopt a model that is felt to be ready for this stage. These would be run on an “at-cost” basis.

What central workshops will there be for the Work Group Leads?

Date (month)	Length	No. of venues	Key function of workshop
Sept 2018	1	1	Introduce core content, pedagogy and guidance Explain the evaluation process and introduce learning logs Look at possible hub models and train-the-trainer models Time to discuss and adapt planning to meet consistency criteria
June 2019	1	1	Focus on evaluation and next steps in developing a Maths Hub SKE programme for TAs

G. Potential Work Group costs

2017-18 Work Groups were in the range £2500 to £6000 depending on the number of sessions, and number of centres where the WG was held.
Train the trainer day – if chosen – 1 day + travel + host hub costs to cover basic venue and refreshments at cost
Venues, resources and refreshments

Title	Developing working partnership with ITT providers		
Phase	Primary and Secondary	**Strategic priority**	7
Stage	Development	**Project code**	**NCP18-22**

A. Project summary

All Maths Hubs will run this Work Group in 2018-19. The aim is to further work already being carried out in many Maths Hubs who are already working with local ITT providers, establish what is working well and spread good practice in this area across the Maths Hub network.

In each hub there will be a Work Group Lead who is already a member of the ITT community. During the year the Work Group Lead will establish contact with all local ITT providers and support the development of a network for these. This will promote discussion amongst providers on good practice and also allow the Maths Hub to share their work and the teaching for mastery approach with trainee teachers.

By the end of June 2019 we would expect all hubs to have a full list of all their ITT providers, (ITE and SCITT, School Direct etc.) and to know which of these are including TfM as part of their provision.

B. Project rationale

It is one if the National Priorities that all Maths Hubs work with ITT providers, some maths hubs already have well established links with local ITT providers, of many types, and others are still setting these up.

Working with this community will be an important part of the wider Maths Hub role as the Teaching for Mastery programme expands and more schools are adopting this style of teaching. It is important that teachers new to the profession are aware of the pedagogy involved. Newly Qualified Teachers will be more aware of the work of the maths hub network and NCETM as well as knowing more about the range of resources available through the NCETM portal.

C. Broad Work Group/Programme outcomes

Professional learning

For ITT providers an understanding of the work of the Maths Hub Network in relation to teaching for Mastery and potential impact on their trainees.

For ITT trainees some input on the principles of teaching for mastery will impact on their subject knowledge and understanding of the connections in mathematics. In particular, the application of the theory of variation to intelligent practice in the classroom and the importance of carefully crafting lessons based on small steps in key learning.

Teaching and/or leadership practice

For ITT providers an impact on their practice and programme planning as they integrate ideas or pedagogy related to teaching for mastery.

Improved teaching for mastery and associated pedagogy in classrooms of Newly Qualified Teachers. There may be some further impact on colleagues already working in those schools.

Whole school/departmental policies and approaches

Some influence on ITT providers' planning through a greater awareness of the expectations in schools that are adopting a teaching for mastery approach.

Newly Qualified Teachers may be able to talk about maths hubs, NCETM and teaching for mastery as they take up post and so influence their schools into becoming involved if they are not already doing so. As they move through their career the NCETM would continue to be a place they go to for support with subject knowledge and pedagogy.
Pupil achievement, attitudes, participation or experience As ITT trainees progress to NQT and beyond their greater understanding of the pedagogy of TfM will impact on pupils' understanding and attainment.

D. Work Group models
Flexible within hubs, possible models and activities will be explored at the September workshop. We would expect the participants to include representatives from several different ITT providers. Current models include: • local cluster meetings • conferences for ITE Providers • conferences for ITT/NQT • maths hubs representatives talking to trainees for whole or part days about TfM and the work of Maths Hubs • maths hubs involved in planning or delivering the maths specific content of the ITT

E. Work Group Lead requirements
The Work Group Lead should be a member of the ITT community with responsibility for planning and/or delivering programmes for trainee teachers.

F. Work Group Lead support			
Two central workshops Interim webinars to see what has been found or going on NCETM community			
What central workshops will there be for the Work Group Leads?			
Date (month)	Length	No. of venues	Key function of workshop
Sept 2018	1 day	1	To explain the rationale and expectations for the NCP
June 2019	1 day	1	Evaluate the outcomes from the project; decide on lessons learned and share best practice. Use the information that hubs have gathered on ITT providers to decide on next steps

G. Potential Work Group costs
In the range £2000 to £5000 depending on how hubs organise the project, a maximum of the equivalent of 8 days Work Group Lead time to support this work.

Title	Developing working partnership for SEND and mathematics		
Phase	*Primary - secondary*	**Strategic priority**	7
Stage	development	**Project code**	**NCP18-23**

A. Project summary

A Work Group is formed with at least one Special School working with a small group of mainstream schools, either primary, secondary or both. Ideally there will be two teachers from each school to support implementation and trialling of ideas. Each Work Group will focus on a content area or theme, for example financial education, or deeper questioning, that is relevant to all students.

The Work Group will promote reasoning and use of manipulatives providing a different approach to working with SEND students across mainstream and special schools. The pedagogy introduced, and any resources trialled would support the principles of Teaching for Mastery.

A possible outcome would be a set of teaching ideas that cover a mathematical age range from early years to post-16. These would also potentially help to narrow the attainment gap through making the mathematics applicable and appropriate for students.

B. Project rationale

Where Mainstream schools and Special schools have worked together to support learning and pedagogy for SEND students both sectors have been able to benefit from an increased understanding of the challenges and opportunities in this area. Mainstream teachers develop a better understanding of a range of SEND needs and pedagogical approaches to support these students; Special school teachers feel more included in the local mathematics community.

This project will get mainstream schools and Special schools talking to each other and more involved in the work of maths hubs. It will allow teachers from both sectors to share experiences and expertise and give special schools a chance to network too. (One of the things they appreciated from the 2016 conferences)

C. Broad Work Group/Programme outcomes

Professional learning
Teachers will improve their understanding of the different areas within SEND and the pedagogy that is associated with working with these students. The focus on one broad theme would enable a greater understanding of the connections within mathematics and introduce teachers to modelling. Increased use of questioning to promote reasoning alongside carefully constructed lessons will enhance teachers understanding of teaching for mastery.

Teaching and/or leadership practice
Classroom practice develops through a series of gap tasks where teachers try out activities to promote depth of understanding, reasoning and fluency; these might include pupil interviews and lesson study. Research and evidence that support these areas will be used to inform their practice and teachers are encouraged to share these more widely in schools to support discussion on current policies and approaches. Teachers develop an “all can achieve” mindset as they realise that with the teaching for mastery approach children have time to grasp concepts and explore them in more depth.

Whole school/departmental policies and approaches
Within mainstream schools there may be a shift in how SEN students are taught

Pupil achievement, attitudes, participation or experience
Increased pupil understanding of mathematics based around a consistency of methodology and teaching for mastery principles.

Pupils develop a deep understanding of the mathematical ideas they are taught so that they fully meet the aims of the National Curriculum (i.e. fluency, reasoning and problem solving)
Pupils will benefit from increased opportunities to explore concepts in more depth, and to develop a greater understanding of the connections in mathematics. They will be more confident in their mathematics and be able to explain their reasoning using appropriate language. Enjoyment and motivation to succeed will be seen in the classroom

D. Work Group models

One model with consistency across the Work Groups in that there will be at least one special school working with a group of mainstream schools at primary or secondary. However, Maths Hubs can run more than one Work Group, and may choose the theme to work on; although this theme should be agreed with the PCT in advance. The number of sessions will be fixed, probably four, with gap tasks between these that would be common across all hubs and adapted if there are different themes. For example, if there is a task to focus on use of a particular manipulative or task.

There is scope for hubs to continue to work on a clear focus with an established Work Group model, or to adapt a standard model available at the September Workshop.

E. Work Group Lead requirements

Ideally someone with a strong SEN and maths background. Either from a Special school, or an experienced SENCo from a Mainstream school who is aware of the range of SEND in special schools.

F. Work Group Lead support

An NCETM Community to share ideas and outcomes as the project develops. Resources and ideas for gap tasks and activities will be shared this way.
Webinars each half term to update WGLs on the next session of the standard model and talk through any issues
Information from the January meeting will be shared by Webinar and through the community

What central workshops will there be for the Work Group Leads?

Date (month)	Length	No. of venues	Key function of workshop
Sept 2018	1	1	Setting the scene, clarification of model and outcomes Sharing the outline plan, webinar dates and suggested gap tasks Explain the evaluation process Sharing previously developed ideas and resources which can be used/adapted by Work Groups
January 2019	1	1	Central workshop for a smaller number of WGLs working with the PCT to evaluate the project so far, re-energise and share possible teaching ideas/ resources for wider use and possibly adapt the plan in light if feedback from Work Group Leads.
June 2019	1	1	Evaluation and discussion of next steps

G. Potential Work Group costs

About £5000