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# Introduction to the programme

The main aim of *Mathematics challenge* is to provide targeted one-to-one support to help those Year 7 pupils currently achieving level 3 in mathematics to attain level 4. Some pupils working at level 4 may also benefit from parts of the programme to address particular weaknesses. Pupils in other year groups might also benefit from this type of support using these materials.

The programme focuses on a **targeted group of pupils** who are capable, with some extra help, of achieving level 4 in mathematics in Year 7. This support is provided by **coaches** – mentors, parents and senior pupils. A coach may support an individual pupil or a group of two or three pupils, all of whom are working to the same target. The school needs to ensure that appropriate security checks on coaches are in place.

The **school organiser**, possibly the school SENCO or a member of the mathematics department, manages the programme. The school strategy manager and organiser need to have an overview of the school's overall intervention programme. There are similar challenge materials to support pupils' reading and writing.

The *Mathematics challenge* pack consists of:

- information for the school organiser (this booklet);
- a summary for the school strategy manager and information for Year 7 mathematics teachers (provided as photocopiable masters in this booklet);
- advice for coaches (a separate booklet that can be photocopied);
- a video showing coaches using the materials;
- support units and resources – card copies of the units and photocopiable masters of the resources are provided for coaches, while a reference paper copy of both units and resources is included for the organiser.

# Organising the programme

The school organiser should:

- know which pupils are being supported;
- know the targets for each pupil;
- allocate pupils to coaches;
- decide the timeframe for support for each pupil.

Although the material could be used to support pupils during an actual lesson, the aim is to provide extra support to help pupils to access their normal mathematics lessons.

This support is in addition to normal teaching and any in-class support that may already be provided. It is targeted at particular pupils and for a specific time. It is best organised as 'pre-teaching' in preparation for a topic being introduced in class so that the pupil can then access the lesson. Alternatively, but less effectively, the materials can be used as consolidation after a lesson.

The support may be arranged on a one-to-one basis or with a coach supporting two or three pupils together. Parents should be informed and may be able to support their children with the work. Coaches need to take account of pupils' responses and, with the organiser or class teacher, adjust the sessions accordingly.

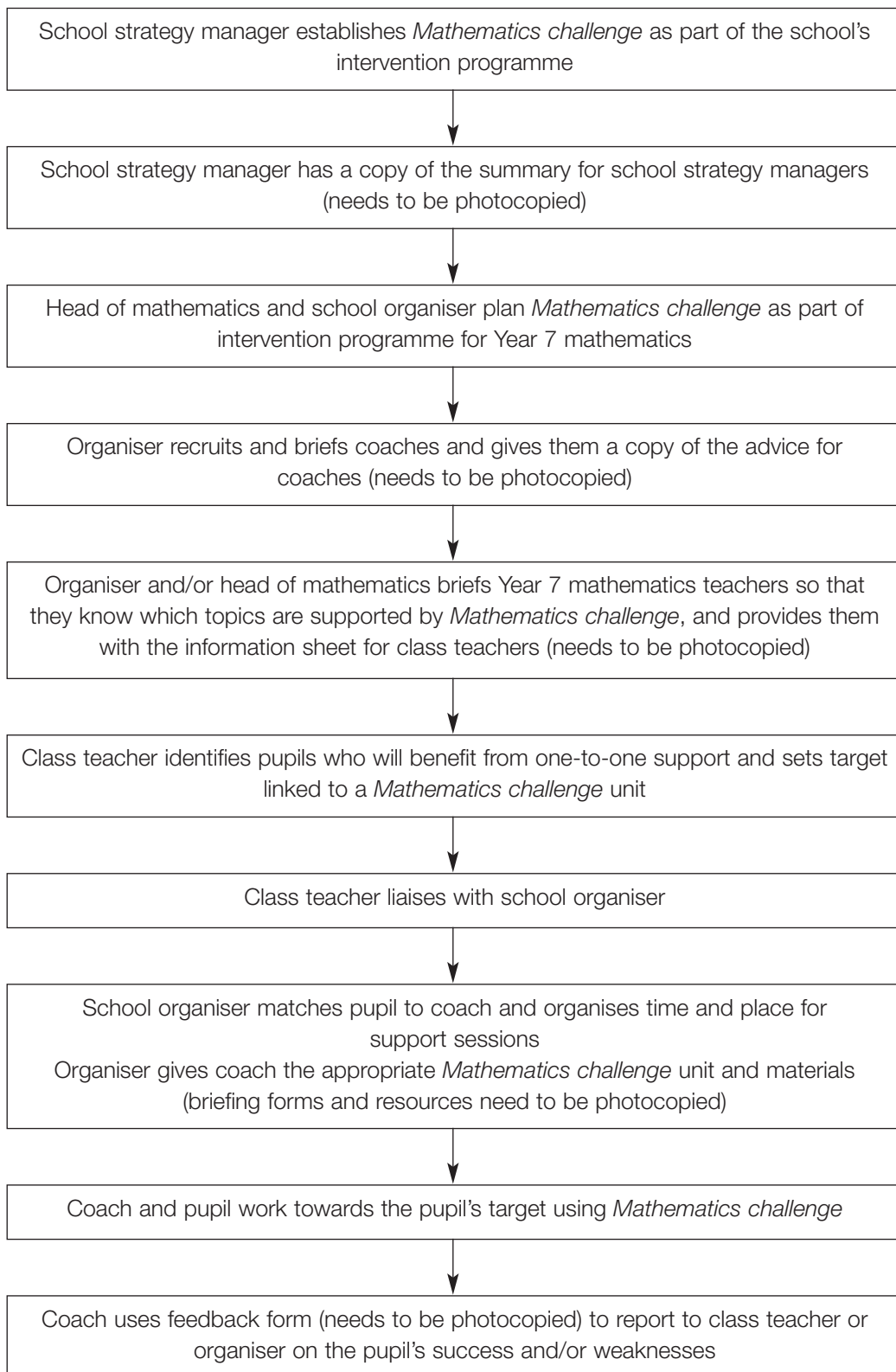
Depending on school timetabling and the deployment of coaches, each unit is suitable for:

- either a series of inputs, each lasting 10 to 15 minutes;
- or several sustained sessions of up to 30 minutes.

Both time and space need to be identified for the programme to operate. The time span is not for the whole year but for a focused input for a short duration on a particular target. These temporary slots may be:

- during the school day – in tutorial time or using withdrawal from lessons, perhaps on a rolling programme;
- before or after school:
  - in a breakfast club;
  - at a homework club;
  - at home with support.

# Implementing *Mathematics challenge*: flowchart for the school organiser



# Outline of the units

Each unit covers a topic that is suitable for a few short extra support sessions. Links are identified in the *Sample medium-term plan: Year 7 intervention*, which is in section 2 of *Targeting level 4 in Year 7: mathematics* (DfES 0085/2003 and 0142/2003).

Unit	Target
1 Mental addition	<ul style="list-style-type: none"><li>To add a pair of two-digit numbers</li></ul>
2 Mental subtraction	<ul style="list-style-type: none"><li>To subtract a pair of two-digit numbers</li></ul>
3 Multiplication tables	<ul style="list-style-type: none"><li>To recall multiplication facts up to <math>10 \times 10</math></li></ul>
4 Fractions	<ul style="list-style-type: none"><li>To recognise the decimal equivalents of simple fractions (tenths, half, fifths, quarters)</li></ul>
5 Using a calculator	<ul style="list-style-type: none"><li>To use a calculator and interpret the display, checking that the answer is sensible</li></ul>
6 Word problems	To solve word problems by: <ul style="list-style-type: none"><li>extracting key information;</li><li>choosing the correct mathematical operation (+, -, <math>\times</math>, <math>\div</math>);</li><li>using an appropriate method of calculation</li></ul>
7 Graphs and charts	<ul style="list-style-type: none"><li>To read and interpret a range of charts and graphs</li></ul>
8 Angles	<ul style="list-style-type: none"><li>To know that there are <math>90^\circ</math> in a right angle and <math>180^\circ</math> on a straight line, and to solve angle problems</li></ul>
9 Sequences	<ul style="list-style-type: none"><li>To recognise and extend number sequences</li></ul>
10 Length and perimeter	<ul style="list-style-type: none"><li>To measure lengths accurately to the nearest mm</li><li>To work out the perimeters of shapes</li></ul>

## Supporting pupils

The group of pupils who will benefit most from this programme are typically in Year 7 and their achievement in mathematics is affected by:

- their ability to retain and use knowledge;
- a poor attitude towards mathematics.

The class teacher has a key role in identifying a pupil's difficulties. The topics covered by the units are those that can be supported by a one-to-one or small-group input and are not so complicated as to need expert knowledge. They do not cover the whole teaching programme, but schools may develop similar materials to address other difficulties.

The **class teacher** should:

- identify the pupils who will benefit from this support;
- diagnose each pupil's mathematical difficulties;
- be familiar with the *Mathematics challenge* units and ensure that the language level is appropriate for the pupil;
- set targets for improvement for each pupil linked to the *Mathematics challenge* targets;
- decide the timeframe for the pupil to achieve the target and share this with the pupil and the school organiser.

While a pupil may achieve a target in a one-to-one or small-group situation, the learning needs to be followed up by the class teacher. This can be done in the course of teaching or may be the focus of a starter or plenary session for the class or a group of pupils. This will enable individuals to revisit the ideas in their usual class.

The **school organiser** needs to:

- brief and support coaches in the use of *Mathematics challenge*;
- give each coach a copy of 'Advice for coaches' (copied from the photocopiable master in this pack);
- coordinate the coaching programme – a minimum of one session per week per pupil for a clearly identified time period;
- make sure class teachers of the pupils involved have information about the units;
- work with class teachers to identify the pupils who will benefit from this support;
- give pupils details of their coach and the time and venue of the sessions.

## Preparing the coaches

The materials have been designed to be used by coaches with a minimum of training or preparation. Each *Mathematics challenge* unit focuses on a clearly defined target.

You are responsible for training, managing and supporting the coaches and ensuring that they are clear about their role.

You will need to brief coaches in the use of the units. This might consist of:

- an introduction to *Mathematics challenge*;
- discussing the advice for coaches;
- introducing some of the units and working through the mathematics;
- explaining the cycle from identifying pupils, through using the units, to pupils attaining their targets or needing alternative support;
- explaining how to use a unit and the resources, for example, number lines;
- watching the video (which models good practice) alongside the corresponding unit;
- explaining arrangements for feedback from coach to organiser or class teacher (a specimen sheet is provided on page 14);
- outlining what to do if problems are encountered.

Some experienced coaches will be able to use the materials after reading the advice for coaches and studying the particular unit that is to be used.

You may choose to give a coach the whole set of units if they are supporting several pupils on different topics, but it may be more appropriate to issue a single unit to the coach to support identified pupils. Paper copies of the units are provided as back-up.

The school organiser needs to give coaches:

- the unit(s) that they are going to use and any necessary materials;
- the targets for the pupil(s);
- information on:
  - the venue and timetable for support;
  - giving feedback to the organiser or the class teacher;
  - school expectations and routines.

The photocopiable masters 'Information for the coach' and 'Coach's feedback form' could be useful in briefing coaches.

# Video sequences

The extracts on video are examples of the materials being used, by different coaches, in schools. It is advisable for coaches to have a copy of the relevant materials while watching the video clips.

Video sequence	Unit	Duration	Description and key points
1	1 Mental addition	8 min	<p>Nima, at stages 1 and 2 of the progression, is beginning to work with additions that have the units digits adding to greater than 10. She does not always see the digit 4 in 43 as being 40.</p> <p>Letia, at stage 4 in the progression, is adding a pair of two-digit numbers and is beginning to work with problems where the answer has a units total greater than 10 and a tens total greater than 100.</p> <p>Daniel, at stage 5 in the progression, is working out 67 plus 78 mentally with occasional errors, and is being extended to adding three numbers mentally.</p>
2	4 Fractions	4 min	<p>Adam has quickly grasped the idea of equivalent fractions and decimals through the session, showing this by asking the coach a question.</p> <p>Jessica, in this brief clip, explains what she understands by equivalence, using the fraction wall to help.</p>
3	7 Graphs and charts	9 min	<p>Amy talks about a pictogram and gradually makes the connection between the symbols and the numbers of children. She persists with an arithmetical error that the coach identifies and discusses.</p> <p>Jessica interprets a temperature chart and reads scales and decimal parts of scales.</p> <p>Steph completes a pre-prepared pie chart and interprets the information on another pie chart where the numbers are more difficult.</p>

We are grateful to pupils, parents and staff in Stoke-on-Trent for support in producing this video.

The coaches are:

Brian Pace      Haywood High School, working with Nima and Daniel

Mick Carr      Sandon High School, working with Letia, Adam and Jessica

Julie Bowers      St Margaret Ward High School, working with Amy, Jessica and Steph



# Evaluating the programme

With the class teacher, the school organiser needs to:

- identify what pupils know already and need to know;
- decide whether this mode of support is appropriate;
- check on pupils' attendance and progress during the programme;
- check the effectiveness of coaches and provide them with on-going support.

Class teachers need to:

- check how well pupils retain and use the information in whole-class situations;
- decide which pupils need further or different support.



# Information for class teachers

The coaching units are listed below to help you identify which pupils will benefit from a particular unit.

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# Summary for the school strategy manager

The main aim of *Mathematics challenge* is to provide targeted one-to-one support to help those Year 7 pupils currently achieving level 3 in mathematics to attain level 4. Some pupils working at level 4 may also benefit from parts of the programme to address particular weaknesses. Pupils in other year groups might also benefit from this type of support using these materials.

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## Funding

Money to support the introduction of *Mathematics challenge* is provided in the Standards Fund through intervention funding. You may also have other sources of funding to support mentoring.



# Information for the coach

School organiser: \_\_\_\_\_

Coach: \_\_\_\_\_

Pupil: \_\_\_\_\_

Class/group: \_\_\_\_\_

## Target/unit

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## Timetable

Day(s)/dates: \_\_\_\_\_

Times: \_\_\_\_\_

Places: \_\_\_\_\_

## Notes

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# Coach's feedback form

Please complete this form and return it to: \_\_\_\_\_

Coach: \_\_\_\_\_

Pupil: \_\_\_\_\_

Class/group: \_\_\_\_\_

## Target/unit

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## Comments

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