

Mixed year-group mathematics teaching guidance



Image: Maeve Birdsall

Many schools have 'mixed-age' classes that contain two or more year-groups, which teachers are told to teach separately, increasing their workload substantially. Currently published materials and guidance are designed for single year-group classes, with an emphasis on 'small steps', making it difficult to plan coherent learning sequences for mixed year-group classes. However, this is not the only approach: effective maths teaching can involve low threshold, high ceiling activities, multisensory approaches and flexible, responsive teaching strategies. [Recent research](#) into 'mixed-age' or 'composite' early years classes in Scotland found these had positive attainment effects for all children. There are also many social and learning benefits for children in extended contact with peers across a range of ages (Lindström and Lindahl, 2011).

We argue that our responsibility is to the learners in front of us, rather than 'fidelity' to a scheme or set of material. Here we include advice and case studies from a range of early years and primary teachers and childminders who have found notable benefits from working with mixed year-groups. No one-size fits all, and we hope that sharing some successful strategies will help others find approaches that support their practice.

Many teachers find the challenges of mixed year-group teaching are the same as having children with a range of mathematical attainment in a class. Even a 'single age' class is actually 'mixed age', with a possible 11 month range (and summer born children are likely to under-achieve, even at [GCSE](#)). For this reason, we refer here to 'mixed year-group' classes. Classes of children with SEND may also include a wide range in aspects of development and might benefit from the flexibility of mixed year-group approaches.

Key strategies include:

- curriculum flexibility, keeping the class together using a common maths focus
 - more open-ended, problem-oriented activities
 - skilled assessment of each child's learning needs, flexible grouping
 - a climate of collaboration, with children helping each other
- Tinkler provides a short research overview [here](#).

Benefits include:

- Children learning from each other, gaining confidence in communicating mathematically, developing collaborative skills and independence
- Teachers gaining a bigger developmental picture, through planning over a longer timescale, and knowing children better, adapting teaching for individuals
- For both: smoother transitions between years and phases

Reference

Lindström E. and Lindahl E. (2011). The effect of mixed-age classes in Sweden. *Scandinavian Journal of Educational Research* 55(2): 121–144

1 Changing approach

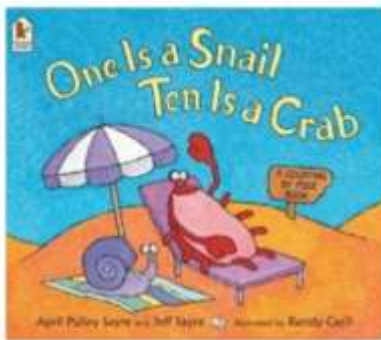


Whilst it might be challenging to make changes to our practice, colleagues have reported that, as they focussed on learning and teaching over a longer timescale, using materials flexibly as suited their class, it became easier and more enjoyable for both teacher and children: “*Teaching takes place in time, learning takes place over time*” (Griffin 2018).

Key changes:

- **Planning over a longer timescale.** Teaching the children for more than a single year leads to us knowing our children better, with one of the biggest benefits being that the teacher has a longer view of the ‘direction of travel’ in term of their learning and how all the ‘smaller steps’ fit together. This increases our ability to adapt our teaching appropriately as best suits the children in front of us. We get a whole picture of, for example the whole key stage in a R/Y1/Y2 class, making us more able to revisit and build on material. It helps to gather together the important parts of a topic to prioritise over a few weeks or the coming months, and ask, ‘What are the things we can start with in this whole sequence of work?’ [Here Ruth Trundley and the Devon Mathematics team have pulled together the key understandings across KS2](#)
- **Keeping the class together as much as possible.** This does not mean all children doing the same task and ‘holding children back’. Instead, all children can work on the same mathematical area or problem in different ways, with communal activity and discussion. For example, working on understanding numbers to 50 might mean that some work on ordering using 100-squares, others build numbers to 20 or 30 with base-10 materials. The teacher’s focus then becomes the children’s learning, rather than ‘getting through’ the material for each year-group. This can enrich and widen younger children’s mathematical experience. Adults working with all ages have pointed out that younger children are able to listen and contribute to the lessons aimed at older children.
- **Using more open-ended and problem-oriented tasks.** A ‘low threshold and high ceiling’ approach involves a starting point which is accessible to all children. For

example, enjoying a picture book such as [“One is a snail”](#), with print-outs of the creatures, allows younger children to work with small numbers, whilst we might challenge older ones to systematically build and record larger numbers (providing adults with assessment opportunities) or work with just two or three of the creatures to find the numerical possibilities. See our ‘loose parts’ example in **Vignettes of practice** and examples in [rich](#).



20 legs
snails,
people
and dogs



Some issues: Challenges or opportunities?

- Planning for the EYFS and the KS1 curriculum together is tricky.** However, combining Reception and Y1 completely smooths out the transition between the two phases, allowing younger children to consolidate foundational concepts and skills, while providing a gentle introduction to the KS1 curriculum. Importantly it gives Y1 children access to free-flow play and continuous provision. Providing a solid KS1 base that is pedagogically sound outweighs any possible planning disadvantages.

2 Useful strategies

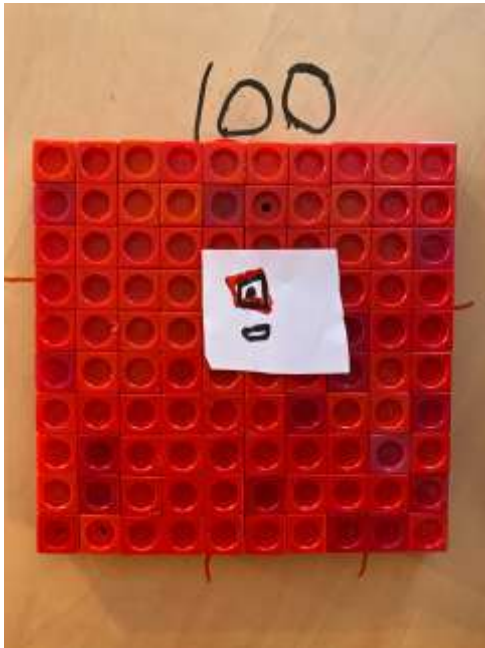


Image: William Gray

The following have been found to be supportive strategies when teaching mathematics within mixed year-group classes.

- **Varying the structure and approach across mathematics lessons:** sometimes you might work together on a topic for a series of lessons, for example, when teaching aspects of measure. At other times, for number work for example, you might spend the bulk of the lesson in smaller groups (which are flexible, and not necessarily based on age) but start and end the lesson together with communal discussion and reflection. This can make mathematics teaching and learning more interesting for everyone: it is dull for both children and teacher if every lesson is identical.
- **Capturing mathematical thinking** is the core of learning mathematics <https://nrich.maths.org/15140> . Using the end of a lesson to share how different [children](#) have been approaching a topic is an important way of making sense altogether, as well as an opportunity for us to assess progress. This is a powerful whole class experience at any age, as it leads to increased input and ownership by every child.
- **Maths talks:** starting a lesson or session with just a picture or image and using the image to inspire discussion, provides essential opportunities for children to listen, speak and reflect. Most slides and materials contain far too many words, so try stripping out the text and beginning by asking: “*What do you see? What do you notice?*” This encourages children of all ages and current understandings to participate. It is also useful for assessment, tuning-in our future teaching to prior knowledge. There is more here in our specific section on *Maths Talk* <https://maths-talks.earlymaths.org>

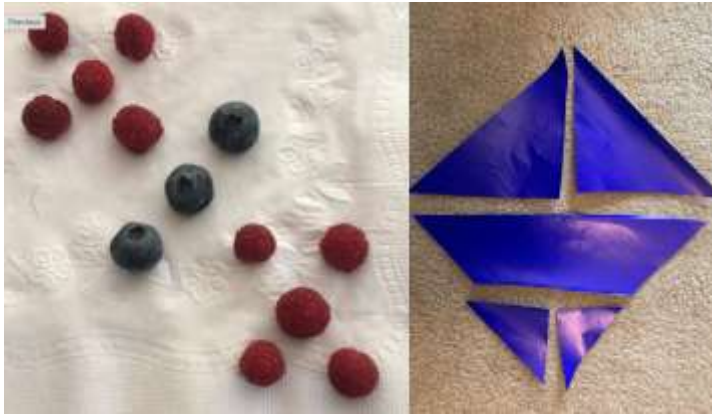


Image: <http://ntimages.weebly.com/photos.html>

Image: Helen Williams

- **Pre-teaching** involves anticipating likely sticking points of a forthcoming 'difficult' topic and spending no more than 5 minutes prior to the lesson with younger learners introducing the topic and some key vocabulary. [This study](#) outlines the benefits of pre-teaching in assigning competence and confidence to children (Trundley 2018). For more information see also [this YouTube webinar: https://www.youtube.com/watch?v=gSo7SY3gAM4](#)
 - **Retrieval practice:** re-visiting material with older children can provide 'horizon knowledge' of forthcoming mathematics for younger children, who hear vocabulary and build a rich breadth of experiences on which to build their future learning, while older children rehearse and re-learn what they are being taught.
 - **'Over-learning' opportunities** involve revisiting and re-affirming the 'basics' while extending what has been taught. The learning of fractions is a good example where over-learning over a longer period of time can be particularly effective. See: https://highlandnumeracyblog.wordpress.com/wp-content/uploads/2015/01/nunes-et-al-fractions_difficult-but-crucial-in-mathematics-learning.pdf
- and
- https://www.researchgate.net/publication/380316747_Learning_obstacles_on_fractions_A_scoping_review
- **Observation-led future teaching** is focused on the sense children are making of what is being taught, as we spiral through material over time.
 - **Pairing younger children with older children** promotes independence, and is an opportunity for explaining, re-visiting and retrieval for older children, as well as preparation for younger children e.g. "Can you help Louis organise our story vote today?"
 - **Using continuous provision** provides opportunities for independent practice of taught ideas and sense-making, including for older children, allowing all to embed their learning by working alongside and explaining to others. See our guidance on continuous provision for mathematics, [here](#).
 - **Considering assigning teaching assistants to subjects:** if this is possible, deeper knowledge of a subject gives these colleagues confidence and an overview of the subject which enables them to better support all learners.

Case study: Matt Curtis has taught in both Y5/Y6 and Y3/4 mixed year-group classes for 8 years, as well as the occasional Y1/2 class.

The biggest benefit I see teaching in classes of mixed year-groups is the opportunity to 'overlearn' when coming back to a concept that the older children have learnt before. It hugely helps to consolidate and deepen their understanding. I tend to pair up children from my older year-group with a partner from the younger year-group. Some great discussions take place, and I encourage the older children to advise and support their younger partners, as it takes a deep level of understanding for a child to help their partner grasp a concept without just giving them the answer or showing them what to do. When I first began teaching mixed year-group classes over eight years ago, I was worried that the children and I would become fed up with each other, but nothing could be further from the truth. I ended up knowing each child much better and understanding the longer learning journey they are on. It also means that children do not need to go through that transitional getting-to-know-you phase with a new teacher. Whilst there are challenges in 'fitting in' the whole curriculum and trying to follow a scheme closely is almost impossible, that isn't necessarily a bad thing. I hope this guidance and our experiences will take away the apprehension that many teachers have when it comes to teaching maths to a mixed year-group class.

References

Nunes, T., Bryant, P., Hurry, J., Pretzlik, U., Bell, D., & Evans, D. (2006), Teaching and learning research briefing no. 13, London, The Institute of Education. *Fractions: Difficult but crucial in mathematics learning*

Sari, I. P., Suryadi, D., Herman, T. & Dahlan, J. A. (2024). Learning Obstacles on Fractions: A scoping review. *Infinity Journal* 13(2) 377-392

Trundle, R. (2018). Changing lives and providing equity through pre-teaching and assigning competence. *Mathematics Teaching* 262: 31-34

3 Vignettes of Practice

Case study: Loose parts with 1- to 4-year-olds



The loose parts are used with a range of ages - the younger and older will explore together with the younger children listening to the older children's language and observing how they are using the loose parts.

1-2 year-olds would fill and empty the basket with the loose parts as well as pretend to count so pointing and showing counting-like behaviour.

2-3 year-olds would use them to count with, in and out of containers.

3- 4 year-olds would recognise the numerals and begin to match the loose parts to the specific number as well as subitising, working on the cardinal principle and simple addition.

Sam Goldsworthy is a childminder

Case study: Mari Palmer and her R/Y1 team

As a leader of a small, but expanding, school we had to make a decision, as we moved from three classes to four, about which year group would be the only year group in school to be a single-aged class. As a head who has only ever led small schools, mixed year-group classes are the norm for me and it seems very strange to have a year group by themselves (this was necessary as one classroom is significantly smaller than the others). Many assumed that we would have a single year Reception class, but we decided to keep Reception and Year 1 in a mixed year-group. As a staff we feel that the transition between these two year-groups is often tricky and this not only enables the reception-aged children to have some amazing role models in the Year 1 children to help develop their play. It also means that the Year 1 children have access to free-flow provision. This does mean that these Class One staff need to plan a range of activities for the children that meet a variety of starting points.

Kate Hind and Charlotte Hardwick, who teach the mixed Year 1 / Reception class, here share ideas of how they have approached this and the benefits for the mixed year-groups, including different objectives and peer tutoring:

(i) Different objectives with the same activity

“Reception have been recently introduced to odd and even numbers and doubles. Y1 have been revisiting these with larger numbers. Having the dominoes in provision allowed the Y1s to lead the game while retrieving their prior learning and giving YR an opportunity to embed their learning.”



(ii) Same activity, peer tutoring

YR have been counting to 20 using Numberblocks in Mastering Number <https://www.bbc.co.uk/iplayer/episodes/b08bzfnh/numberblocks> . A Y1 pupil wanted to play with our Numberblocks set. A Reception child joined her. The Reception child confidently made Numberblocks to 10, then could not remember what came next. The Y1 child encouraged her to keep counting out loud. They then counted out the Numberblocks together. (The Y1 child had been struggling with the numbers herself, but rehearsing with a younger child helped her confidence).

Case Study Hannah Shepherd and her Nursery and Reception children

Although nursery and reception have different 'curriculum objectives' we look at our early years unit as a whole and adapt the teaching accordingly regardless of who is a nursery child and who is in reception. We create experiences, opportunities and problems in everyday play that link to the maths curriculum objectives. The benefits of this are that:

- *the learning is pitched appropriately to where the child is working at rather than their 'age range',*
- *it gives nursery children who are more experienced exposure to the next steps and more challenging activities*
- *it similarly gives the reception children needing more consolidation and support the opportunities to access the maths at a different level.*
- *the more confident children (of whatever age) can support peers through the play and the less confident children can feel safe in their learning without the fear of it being too hard.*

We foster an 'every child can' approach and adapt the activities accordingly through a range of ways - practical, learning through play, everyday maths, focused activities, independent exploration all supported by adults or peers. The wide range of opportunities ensure every child can access the maths learning.

Case Study **Kim Woolham and her Y1/Y2 mixed class**



Our mixed-age planning starts with the objectives from our school's long-term plan roughly matched up, to make it easier for teachers to teach coherently. This means that sometimes we can teach the class together but sometimes Y1 and Y2 groups have different topics. The curriculum is spiral, so teacher planning will highlight in yellow what has been covered and understood well and in green those objectives that need additional time when taught again.

Example:

YEAR 1&2	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8	Week 9	Week 10	Week 11	Week 12	Week 13	Week 14
Autumn	Number - number (add, subtract within 10 and money)	Number - addition and subtraction (within 10 and money)	Geometry - properties of shapes	Number - number and place value (within 10)	Number - multiplication and division	Measurement - length and height	Money							
	<ul style="list-style-type: none"> Sort objects Count objects Reassemble objects Count, read and write numbers to 10 Count, read and write two-digit numbers to 10 Count and write two-digit numbers to 10 Count and write Count one less 	<ul style="list-style-type: none"> Part-whole model Fact families - addition facts Number bonds within 10 Systematic methods for number bonds Number bond to 10 Compare number lines Addition - adding together Addition - adding more Adding a part Subtraction - 'how many left' Subtraction - finding a part/breaking a part Part families Subtraction - counting back Subtraction - finding the difference Comparing addition and subtraction statements 	<ul style="list-style-type: none"> Recognise 2D shapes Sort 2D shapes Recognise 3D shapes Sort 3D shapes Records with 10 and 100 	<ul style="list-style-type: none"> 1, 10, 100, 1000 Represent numbers to 100 100s and 10s 100s and 10s using part-whole model Tens and ones using subtraction 100s and 10s using subtraction Compare numbers Order numbers and objects Order numbers Order numbers Number lines 	<ul style="list-style-type: none"> Place value Add equal groups Place value Place value Place value Place value Place value Place value Place value Place value Place value Place value Place value Place value Place value 	<ul style="list-style-type: none"> Compare length and height Measure length Measure length Measure length Measure length Measure length Measure length Measure length Measure length Measure length Measure length Measure length Measure length Measure length Measure length 	<ul style="list-style-type: none"> Recognising coins Recognising coins Counting in coins Recognising coins Recognising coins Recognising coins Recognising coins Recognising coins Recognising coins Recognising coins Recognising coins Recognising coins Recognising coins Recognising coins Recognising coins 	<ul style="list-style-type: none"> Application of skills in problem solving Application of skills in problem solving Application of skills in problem solving Application of skills in problem solving Application of skills in problem solving Application of skills in problem solving Application of skills in problem solving Application of skills in problem solving Application of skills in problem solving Application of skills in problem solving Application of skills in problem solving Application of skills in problem solving Application of skills in problem solving Application of skills in problem solving Application of skills in problem solving 						
	<ul style="list-style-type: none"> Sort objects Count objects to 100 Count forwards and backwards within 100 Count forwards and backwards within 100 Two and one hundred Read and write numbers (numbers and words) Count one more Count one less 	<ul style="list-style-type: none"> Part-whole model Number bonds within 100 Compare number statements Check calculations Round to 100 Add and subtract 100s 100 more, 100 less Add and subtract 100s Add to make 100 Two 100s, one one digit Subtraction - crossing 100 Subtract a 10 from a 100 Add 2, 10, 100 numbers Subtract a 10 from a 100 Find and make number bonds to 100 Add 2 10 numbers 	<ul style="list-style-type: none"> Recognise 2D shapes Sort 2D shapes Recognise 3D shapes Sort 3D shapes Records with 10 and 100 	<ul style="list-style-type: none"> Represent numbers to 100 100s and 10s 100s and 10s using part-whole model Tens and ones using subtraction 100s and 10s using subtraction Compare numbers Order numbers and objects Order numbers Order numbers Number lines 	<ul style="list-style-type: none"> Place value Add equal groups Place value Place value Place value Place value Place value Place value Place value Place value Place value Place value Place value Place value Place value 	<ul style="list-style-type: none"> Compare length and height Measure length Measure length Measure length Measure length Measure length Measure length Measure length Measure length Measure length Measure length Measure length Measure length Measure length Measure length 	<ul style="list-style-type: none"> Recognising coins and notes Count money Select money Make the same amount Compare money Find the total Find the difference Five change Two step problems 	<ul style="list-style-type: none"> Application of skills in problem solving Application of skills in problem solving Application of skills in problem solving Application of skills in problem solving Application of skills in problem solving Application of skills in problem solving Application of skills in problem solving Application of skills in problem solving Application of skills in problem solving Application of skills in problem solving Application of skills in problem solving Application of skills in problem solving Application of skills in problem solving Application of skills in problem solving Application of skills in problem solving 						

These are then turned into short term plans, for example:

12.09.23
LO: To count
Y1- Success Criteria
<ul style="list-style-type: none"> Look at image Use finger to tap count each picture Cross them out to check answer is correct
Y2- Success Criteria
<ul style="list-style-type: none"> Look at each image Decide what I could count in (2,5,10's) Count the objects Check on my answer

18.09.23
Y1-LO: To count up to 50
Success Criteria
Count together
Count with our peers
Count independently
Y2-LO: To identify tens and ones
Success Criteria
Identify the tens
Identify the ones
Recognise tens in a 2 digit number
Recognise ones in a 2 digit number

The children have access to our fully equipped maths provision all day and are encouraged to use these. Trays contain pre- and post- teach activities to support both year groups with their maths objectives throughout the week.

4 Resources

As we work with our mixed year-group class, we become more confident in selecting from all available published materials, flexibly, to suit our children, and consider a longer time-scale – we simply need to make a start. It helps if we already know our materials. Rather than looking for something ‘perfect’, it is better to approach what we already have flexibly, pulling resources from elsewhere where necessary. Some places to go to for supplementary materials are included here:

Some starting points

- **nrich** provides a range of problems which you can select for a mixed class here: <https://nrich.maths.org/students/primary>

<https://nrich.maths.org/teachers/early-years>

- **ATM** has some short 'maths snack' videos introducing something to explore mathematically here: <https://atm.org.uk/maths-teaching-resources/maths-snacks-videos>
- **ECMG** has lists of picture books for stimulating open-ended mathematical work: <https://earlymaths.org/maths-picture-books/>
- <https://dreme.stanford.edu> is a very family-friendly website with low-threshold maths tasks which would be helpful for childminders working with a range of younger children.

Notes