Should We Teach Times Tables in Times Tables?

It's a deliberately quirky question. Often, the way we name a thing defines how we think about it. Multiplication and division facts have traditionally been listed and memorised in times tables - a series of groups of facts with one common multiplier. It's baked deep into both the history of mathematics and the history of mathematics learning.

The National Curriculum gives us an order in which to learn the times tables. The NCETM gives a similar but different order. The T in MTC stands for "tables". But what if the name "times tables" was blinding us to a radically different approach?

One reason to change is that times tables stop us making the most of connections between facts. The factors of 24 are potentially one of the richest areas of primary maths. Yet with times tables we learn 2 × 12, 3 × 8, 4 × 6, 6 × 4, 8 × 3 and 12 × 2 in six different places.

Another reason is that we tend to learn the "times" (multiplication) first and hope to reverse-engineer factors and division later. The M in MTC stands for "multiplication". But moving from 4 × 8 to 32 ÷ 4 is far from trivial. A recent large study showed that students score differently when asked 6 × 9 or 9 × 6. It's not even a simple matter to move from one multiplication fact to its commutative equivalent.

Above all, times tables encourage children to learn facts through patterns of repeated addition - literally the thing multiplication facts are supposed to help us move beyond.

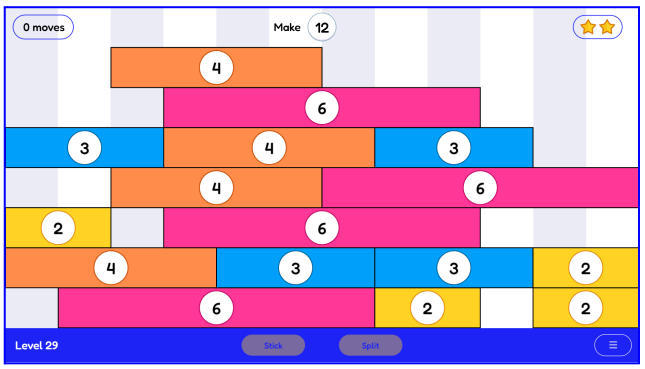
So imagine times tables had never been invented and we were trying to devise an approach from scratch. How would we teach multiplication and division facts if our goal was to maximise connections and make division and factors just as important as multiplication?

One obvious answer is to work through integers in increasing size. For each number in turn, we learn its factors, the connections between them and the way they multiply back to the original number. To begin with, we might only work with numbers up to 10. But when (and only when) these are mastered, we add some more.

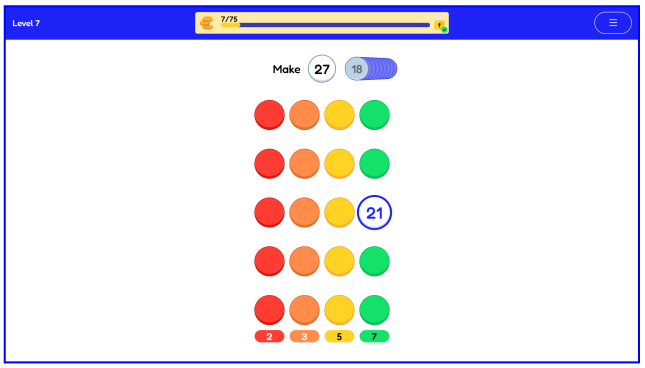
Conveniently, this means students encounter numbers in increasing size. They don't learn 3 × 9 until they are comfortable with numbers smaller than 27.

It also means that when they are learning about 12, they can use what they already know about 6 and 4 to build connections between facts. Connections make facts more likely to stick and more likely to be useful.

NumberClub has two games built around this approach: Stick and Split and Number Ramble. Neither game asks traditional times tables questions. Instead, children learn ways to make and decompose numbers in increasing size, giving division and factors just as much importance as multiplication.



Stick and Split



Number Ramble

There's a free trial available at https://numberclub.com.

They are also running a small research project next year, and selected schools can receive free access. More details are available here: https://docs.google.com/document/d/1YI83bH9fLh-x8FlzI3MA3E_pGhlXeQ9dbC0unTm20rY