**Common Misconceptions in Math**

**1. A number with three digits is always bigger than one with two.**Some children will swear blind that 3.24 is bigger than 4.6 because it's got more digits. Why? Because for the first few years of learning, they only came across whole numbers, where the 'digits' rule does work.

**2. When you multiply two numbers together, the answer is always bigger than both the original numbers.**Another seductive 'rule' that works for whole numbers, but falls to pieces when one or both of the numbers is less than one. Remember that, instead of the word 'times' we can always substitute the word 'of.' So, 1/2 times 1/4 is the same as a half of a quarter. That immediately demolishes the expectation that the product is going to be bigger than both original numbers.

**3. Which fraction is bigger: 1/3 or 1/6?**How many pupils will say 1/6 because they know that 6 is bigger than 3? This reveals a gap in knowledge about what the bottom number, the denominator, of a fraction does. It divides the top number, the numerator, of course. Practical work, such as cutting pre-divided circles into thirds and sixths, and comparing the shapes, helps cement understanding of fractions.

**4. Common regular shapes aren't recognised for what they are unless they're upright .**Teachers can, inadvertently, feed this misconception if they always draw a square, right-angled or isosceles triangle in the 'usual' position. Why not draw them occasionally upside down, facing a different direction, or just tilted over, to force pupils to look at the essential properties? And, by the way, in maths, there's no such thing as a diamond! It's either a square or a rhombus.

**5. The diagonal of a square is the same length as the side?**Not true, but tempting for many young minds. So, how about challenging the class to investigate this by drawing and measuring. Once the top table have mastered this, why not ask them to estimate the dimensions of a square whose diagonal is exactly 5cm. Then draw it and see how close their guess was.

**6. To multiply by 10, just add a zero.**Not always! What about 23.7 x 10, 0.35 x 10, or 2/3 x 10? Try to spot, and unpick, the 'just add zero' rule wherever it rears its head.

**7. Proportion: three red sweets and two blue.**Asked what proportion of the sweets is blue, how many kids will say 2/3 rather than 2/5? Why? Because they're comparing blue to red, not blue to all the sweets. Always stress that proportion is 'part to whole'.

**8. Perimeter and area confuse many kids.**A common mistake, when measuring the perimeter of a rectangle, is to count the squares surrounding the shape, in the same way as counting those inside for area. Now you can see why some would give the perimeter of a two-by-three rectangle as 14 units rather than 10.

**9. Misreading scales.**Still identified as a weakness in Key Stage test papers. The most common misunderstanding is that any interval on a scale must correspond to one unit. (Think of 30 to 40 split into five intervals.) Frequent handling of different scales, divided up into twos, fives, 10s, tenths etc. will help to banish this idea.

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