Facing the Facts - NWMC 2015 - Whistler

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Math memorized is not math understood nor math remembered.
Knowing several ways to find 7 x 8 will stay with students, even if they forget the original fact.
We need opportunities to come to remember facts rather than memorize.
Fluency is a byproduct of students' experiences and flexibility with numbers and operations.
If fluency is treated as the primary directive, things will go badly very quickly.
It will emerge with patience - let it happen.

Use Any Operation

use these digits 5, 7, 2, 8 (or pick any)
and any operation (+, -, x, ÷) to make the numbers 1 - 30.
Can be completed in small groups
or in groups who all contribute to completing all of the numbers.
this is a good example of reducing the anxiety by giving the answer

How Many Ways?

how many ways can you make 12?
students work in pairs or groups to come up with ways
Variations:
15 = 8 + 7 Give me three ways you know that.
e.g., 7 + 7 + 1 8 + 8 - 1 8 + 2 + 5 7 + 3 + 5
Benefits of giving the answer:
- no wrong answer - safe
- highlights different strategies
- shifts from I know one thing (answer) to I know many things.
- giving answer switches from product to process - from fluency to flexibility

S | K | U | N | K

Work in one column at a time. Each letter is one round.
Students stand in pairs.
Teacher rolls two dice - writes number of each die on board (don't add it for them)
Students write sum of dice under S.
They can choose to remain standing (to possibly gain more points) or sit (ensures points are kept). Once they sit, they must remain sitting for the rest of that round.
Rolling a 1 means that every team still standing loses all their points for that round.
Continue rolling until no team is standing or a 1 is rolled.
All stand again to begin next round under letter K.
Modifications:
1. grade 1 - use dice marked with only 0, 1, or 2
   - use one dice with sad face for lose points
2. use one dice that is only marked with 7, 8, and/or 9 - strategies for adding will emerge
3. jr high - positive and negative integers
   - multiply

4. roll multiple dice
after second game - ask *who thinks they* won
before third game - ask to decide on a strategy before beginning
after third game - ask *who they think* won
subordination - pain free way to practice facts under guise of game
Affordances:

- no public sharing
- no high stakes
- lots of practice
- trick into practice

Snap It

Each child makes a train of connecting cubes of a specific number (start with 5 or 10).
On the signal snap, break their trains into two parts and hold one in hand behind their back.
Then they walk around showing remaining cubes for others to work out the difference.

Salute

deck of cards - no face cards
groups of three
two students stand facing each other each holding half of the cards
without looking at it, each flips up a card from their deck and holds it facing towards the other student
the third student says: the sum of your cards is…. or the product of your cards is….
the two students have to guess what card they're holding in their hand
variations:

- use only card values 1 to 5
- in pairs:
- Complements of 10 -
  - without looking at it, each holds up card towards other
    - Partner A says: you have 4 missing (Partner B says: I have a 6) and vice versa
- Doubles -
  - Partner A flips up card without looking at it
    - Partner B says: your double is 8 (Partner A says: I have a 4)

Grid Multiplication

can play individually as whole group, or partners in groups of four.
Roll two dice.
Students draw and label an array on grid that matches the numbers on the dice
e.g., Roll a 2 and a 5, students draw a 2 x 5 or a 5 x 2 on the grid.
Game ends when there are three rolls in a row that no student can use.
Goal is to be the one to have fewest unused squares.
Variation:
Use the sum of the dice as the product. The student can draw any array that fits the product.
e.g., Roll a 2 and a 5, the student could draw a 10 x 1 or 2 x 5

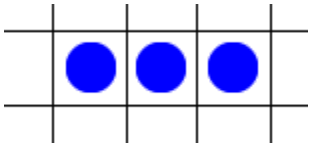
Building Number Facts (from NRICH maths)

Arrays can be used for building multiplication facts in a meaningful way. Before drilling and memorising tables, children must understand how these facts are derived. For example, by progressively adding another column of three objects, children can build the three-times tables for themselves. This representation not only assists in understanding the process, but provides a visual image for children to draw upon as they begin to use and memorise the basic number facts.

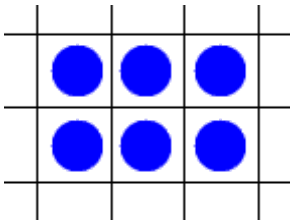
1 x 3 or 3 x 1 | 2 x 3 or 3 x 2 | 5 x 3 or 3 x 5 | 4 x 3 or 3 x 4 | 3 x 3 or 3 x 3

Making Shapes

I have three counters. I arrange them on a grid to make a rectangle like this:



I wonder if there are any other rectangles I could make with just three counters?
If I had six counters, I could make a rectangle like this:



Are there any other rectangles that I could make with six counters?
Imagine you have 18 counters to put on a grid.
Arrange any number of counters on the grid to make a rectangle (not just its outline).
How many different rectangles can you make with each number of counters?