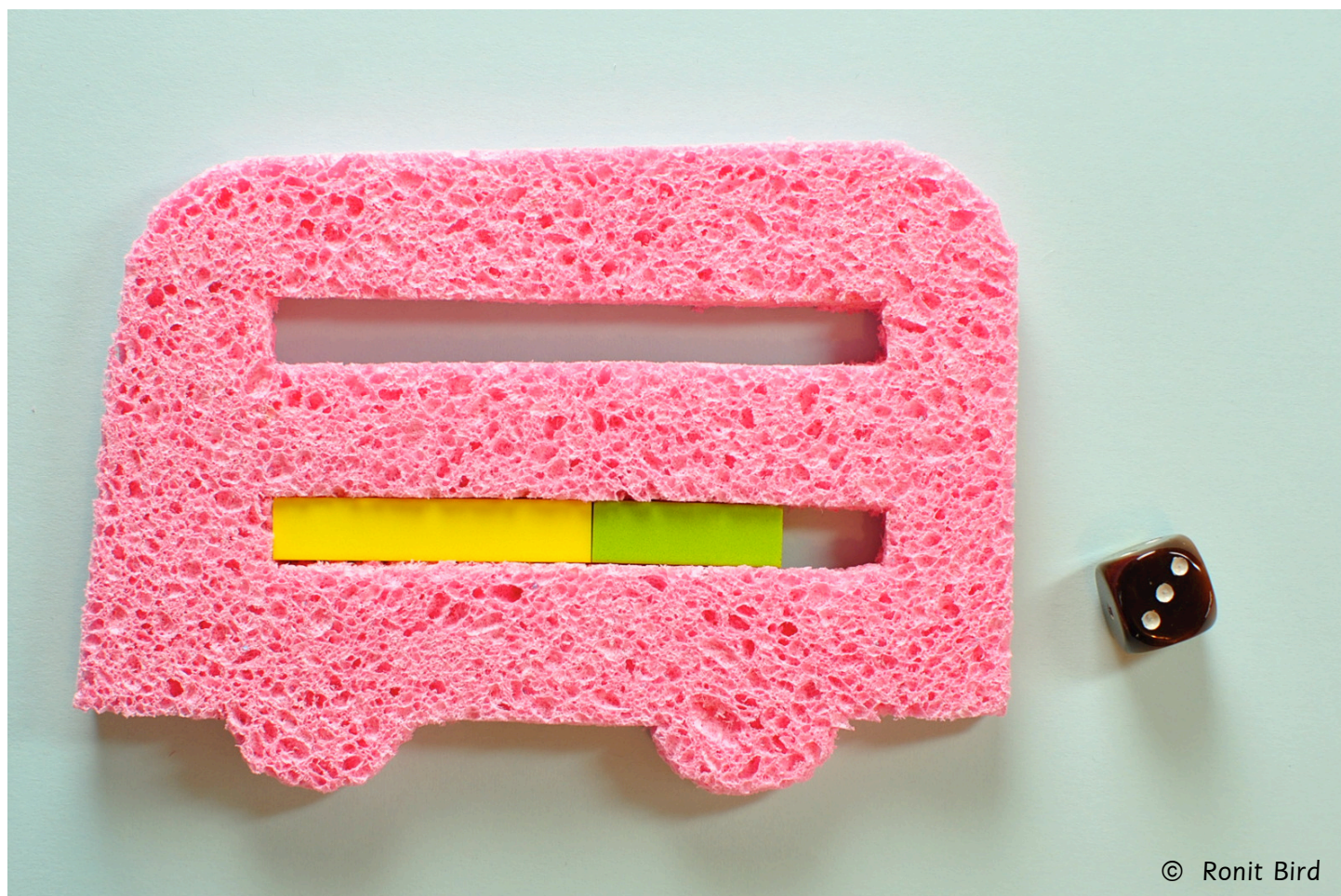# THE COMPLEMENTS TO 20 BUS GAME

I adapted this game from a worksheet I saw many years ago on which was drawn an outline of a double-decker bus. The worksheet directed pupils to take counters to put on the windows of the bus to represent faces looking out.

I really liked the idea of the bus because the double-decker element was perfect to highlight the fact that 20 is composed of two 10s, a crucial concept when working with complements* to 20. However, I am always worrying about relying too much on counters to model quantities: it prompts children to keep thinking about numbers as collections of ones, instead of as units in their own right. I therefore adapted the worksheet and created a game that features continuous base-ten materials – Cuisenaire rods – instead of discrete counters.

See my books for much more on the dangers of counting in ones and on the wonderfully versatile Cuisenaire rods.

Preparation:

I cut two 10 cm by 1 cm slots out of modelling foam and shaped the surround into an approximation of a bus shape**. A widely available alternative to modelling or packaging foam is kitchen sponge, as shown in the photo below. Because Cuisenaire rods are based on centimetre measurements the two slots each snugly accommodate an orange 10 (i.e.10 cm) rod.

Teaching points:

✦ *The game is designed to practise the complements to 20.*
N.B. Only play this game after teaching the complements to 10.***

✦ It gives children practice in building larger numbers from two smaller components, and in breaking up a unit of 10 into smaller components.

✦ It provides practice in the tricky 'teen' numbers.

✦ It shows, in a concrete way, how bridging through 10 works and what kind of questions bridging can help solve.

Equipment needed to play the game:

♣ A foam bus (above) and a recording sheet (below) for each player.

♣ An ordinary 6-sided spot die.

♣ Cuisenaire rods.

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* The word 'complement' comes from the word 'complete' and usually refers to 10, or a multiple of 10, that is considered a target number that need to be completed, made whole.

** For learners of an age to feel that a bus shape is too childish, cut one 10 cm by 2 cm slot from a foam rectangle, and adapt the headings on the game recording sheet provided (below).

*** I usually introduce the concept of complements to 10 through a bead string made of 10 beads in two colours, arranged so as to replicate a single row of a Slavonic abacus. (See my books for more on this, in particular 'The Dyscalculia Toolkit'.) Once pupils know the five complement facts, or can derive them by visualising the bead string model or by reasoning from one of the known facts, they can begin to extend the concept to complements to 20. Two bead strings used together can help children to see that if 20 is partitioned into two components, one of the two 10s will always be unbroken while the other (unless the partitioning is into10 + 10) will always be broken into complement pairs. Another good way to explore complements to 10 is by turing a Cuisenaire rod 'staircase' into a 'wall'.

The Complements Bus Game   Recording Sheet

A game for 1 or 2 players

RULES:
Play with Cuisenaire rods and a die to decide how many 'people' get on the bus. Take <u>one</u> rod to match each throw, exchanging rods when necessary. On each turn, record how many are on the bus and how many empty seats remain. When the bus is full, use the die to get people off the bus. Can you fill the bus and empty it again in only 10 throws? Can you beat your previous record? Or, can you beat an opponent in a race, taking turns to throw the die?
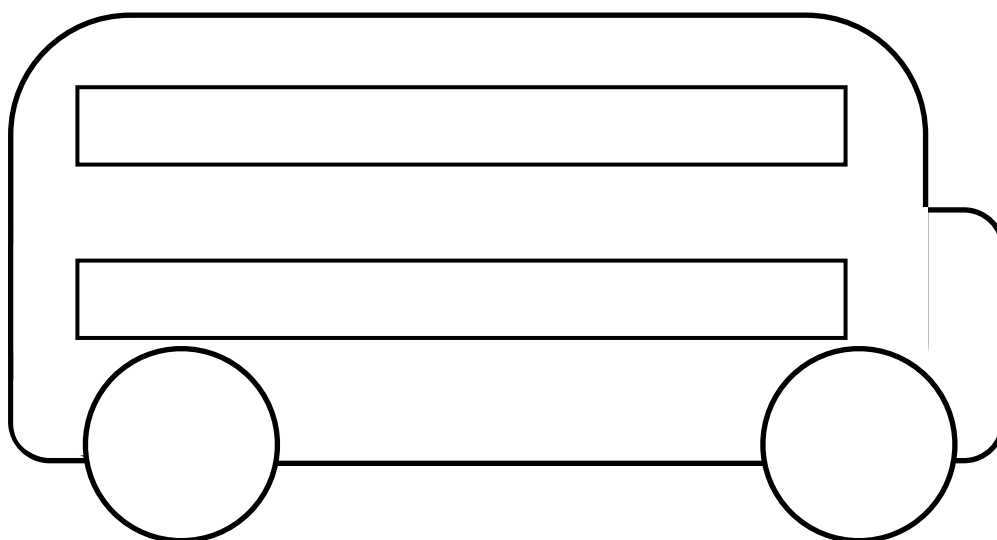
	Die throw is:	Seats used	Empty seats
1st throw:			
2nd throw:			
3rd throw:			
4th throw:			
5th throw:			
6th throw:			
7th throw:			
8th throw:			
9th throw:			
10th throw:			