

The idea of teaching one key fact about each number up to 10 is that it reduces the burden on a child's memory and promotes teaching for understanding, not learning by rote. Once a child knows a single component fact about a particular number, and has been taught how to use logic to derive new facts from known facts, everything about that particular number can be found by reasoning techniques and visualisation.

The key component facts that I choose to teach are the doubles and near-doubles facts.

The above is an extract from my ebook *Exploring Numbers Through Dot Patterns* [Apple Books]. In it, you can find detailed instructions for practical ideas designed to explore the way the numbers up to 10 are built from, or can be split into, smaller quantities. More than 100 minutes of video are embedded into the ebook's text to demonstrate all the activities and the many teaching games.

More games for learning about component facts can be found in *The Dyscalculia Toolkit*, *Overcoming Difficulties with Number* and *The Dyscalculia Resource Book* [all published by Sage].

KEY COMPONENT FACTS – Doubles and near-double facts for the numbers up to 10



$$1 = 1$$



$$2 = 1 + 1$$



$$3 = 1 + 2$$



$$4 = 2 + 2$$



$$5 = 2 + 3$$



$$6 = 3 + 3$$



$$7 = 4 + 3$$



$$8 = 4 + 4$$



$$9 = 5 + 4$$



$$10 = 5 + 5$$

TEACHING POINTS

The game, for 2 or more players, provides practice in mental addition of small numbers while focusing on the '**key component facts**'. No counting in ones is allowed during the game.

The **key facts** that I choose to teach are the doubles or near-doubles facts. So, for example, the fact that 7 can be built from 5 and 2 is a valid component fact, but the '**key component fact**' about 7 is that it is built from 4 and 3.

A focus on key facts allows children with weak memories to feel really secure about a very small repertoire of known facts, so that they can derive other facts by reasoning.

Before playing this game, players should be familiar with the concept of **key component facts**, should have had the opportunity to make and explore number patterns concretely using counters or nuggets, and should have been introduced to some basic reasoning strategies (namely, deriving near-doubles from doubles facts, or knowing how to add 1 or 2 to a number).

EQUIPMENT NEEDED TO PLAY THE GAME

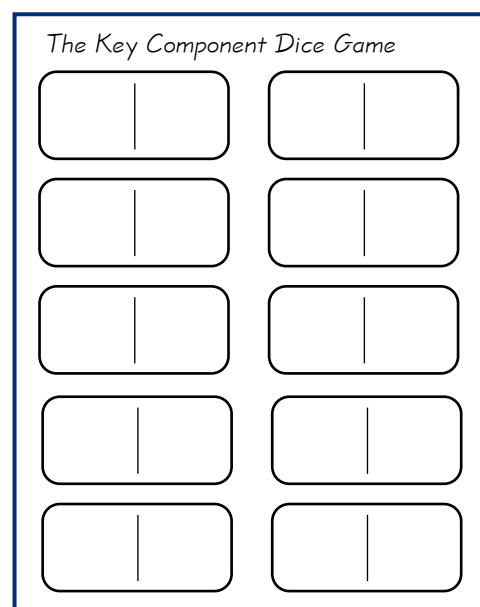
Two 6-sided dice on which the pattern for 6 on each die is covered with a blank sticker. Draw a pattern of 3 on one sticker and a pattern of 4 on the other.

Paper and pencil. Each player sketches 10 rectangles divided into two, to represent 10 blank domino tiles.

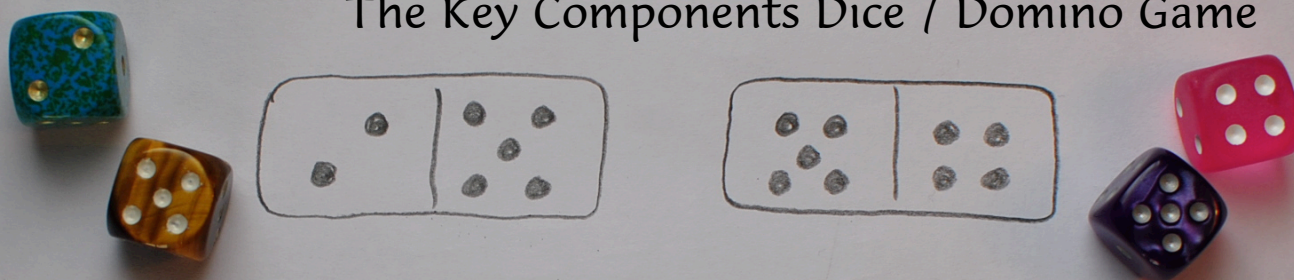
A pot of nuggets, or other attractive tokens, for scoring.

RULES

Players take turns to throw both dice. On your turn, copy both dice patterns onto either side of one domino outline. Read each number separately and then say what the total is (without counting in ones!). If your total is correct, you win one token. If the dice show a key fact about the total, and you identify it as a key fact immediately (before play passes to the next player), you can claim a second token.

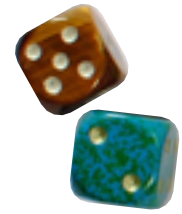


The Key Components Dice / Domino Game



The player throwing the pair of dice at the left can win one token by announcing the correct total of 7. If the player throwing the two dice at the right can give the correct total of 9 and also say that "4 and 5 are the key components of 9", s/he can win two tokens on this turn.

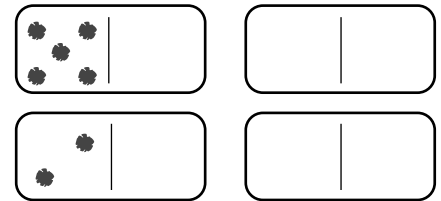
VARIATIONS on the Key Components Dice / Domino Game



Variation 1

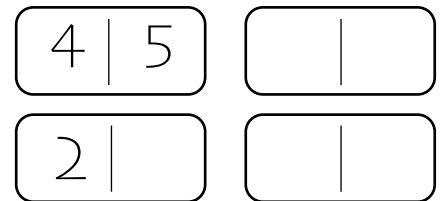
You may choose to draw each dice pattern separately into the empty half on any domino outline. When you complete a domino, announce its total for 1 point. Score 2 points for every **key fact** you identify that's drawn onto a single domino.

This variation introduces an element of strategy and planning.



Variation 2

Older or more experienced players can try playing at a more abstract level. Play either the basic game or the first variation (above) by writing digits instead of drawing dots onto your game board. Or do without a game board altogether to play the basic game, by simply adding the two dice numbers mentally for one point and identifying any totals derived from a key fact for an extra point.

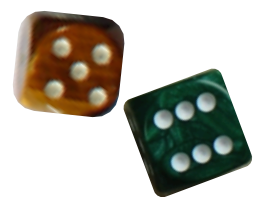


Variation 3

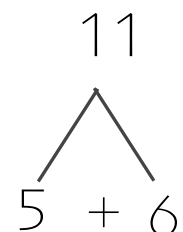
Play either the basic game or the first variation (above), but using two ordinary 1 – 6 dice.

This variation is the most challenging not only because the highest possible total is now 12 rather than 10, but because players may need to use more advanced strategies for some combinations. In the previous variations, provided players know their key facts (doubles and near-doubles) up to 10, and know how to add 1 or 2 to any number, all but one of the possible combinations of any dice throw will be straightforward (the exception being 5 and 3).

But using 1–6 dice might present a player with other less familiar combinations: as well as 5 + 3 players might be faced with 6 + 3, 6 + 4, or 6 + 5. Children should be taught to find any totals they don't know by reasoning from the nearest fact that they do know for certain (e.g. knowing that 5 + 5 is 10, leads to the deduction that 5 + 6 must be 11).



For Variation 3, make game boards by drawing ten triads, rather than domino outlines. On your turn, record the numbers from your dice throw, as digits, below any two free branches of any triad. Write the totals at the top of the triads as you complete them, or at the end of the game. The game is over when each player has had 10 turns of throwing both dice.



Score 1 point for every correct addition, with an extra point awarded for identifying any triad that shows a key component fact.

NOTE: Doubles facts will result from both dice showing the same number, and near-doubles facts will result from both dice showing consecutive numbers, but do not alert children to this observation. Let them work it out for themselves.