

The best time for children to learn about subtraction is alongside addition, while exploring number components and number relationships. The process should begin at the very earliest stages of hands-on practical experience using concrete materials, such as counters and Cuisenaire rods.

Once efficient calculation strategies have been taught and understood, games are an ideal way of rehearsing any methods that need further practice.

Many of the games that I have devised over the years aim to provide simultaneous practice in both addition and subtraction. For example, in the collection of 'Various card games ...' on the games page of this website, games such as 'Tens Away!' or 'Thirteens & Fifteens' may appear to be about addition but actually require players to think, 'What must be added to a given number in order to reach a target number'. It is this concept that provides the essential foundation for understanding subtraction as the 'difference' between two numbers, a difference that can be calculated by complementary addition. Similarly, in the games below, the focus appears to be on subtraction but a valuable outcome is to reinforce players' understanding of the inverse relationship between addition and subtraction.

The games selected here are all easy to learn and quick to play. They are deliberately pitched at different learning stages – concrete, pictorial and abstract – and different levels of difficulty.

[Note that the cards specified in some of the games can be created from the templates at the end of this document, with more choices available on the resources pages of this website.]

Missing Numbers 1–2–3

Post-It-Note Subtraction

Descent

Frame a Subtraction

Subtract From 15

Subtraction Equations Game

Su Doku Puzzles

Missing Numbers 1–2–3 is played at the concrete level with Cuisenaire rods. It focuses on subtraction as ‘difference’ and requires players to make numerous comparisons between assorted pairs of numbers up to 10.

[This game first appeared in my ebook *Exploring Numbers Through Cuisenaire Rods*, published on Apple Books.]

Post-It-Note Subtraction focuses on the same small differences between pairs of numbers up to 10 as the previous game, but this game is harder because it is played at the abstract level. Players have to subtract numbers mentally by using their knowledge of the ‘key’ component facts, as well as the other component facts, of the numbers up to 10.

[This game was included in the 3rd edition of *The Dyscalculia Toolkit*, published by Sage.]

Descent is a game about taking away small amounts, in several successive steps, working backwards from 50. The game is played at the concrete level, with Cuisenaire rods, and its focus is on partitioning numbers and exchanging them for smaller components. [This game first appeared in *Overcoming Difficulties with Number*, published by Sage.]

Frame a Subtraction is a more challenging game, played concretely with Cuisenaire rods, but recorded diagrammatically on an empty number line. The focus is on using the bridging technique to subtract from a teen number. In contrast to the previous game ‘Descent’, in which each subtraction is treated as ‘taking away’ a few units, in this game every subtraction involves decomposition and is performed and recorded as complementary addition, i.e. by working forwards. [This game was included in the 3rd edition of *The Dyscalculia Toolkit*, published by Sage.]

Subtract From 15 is a card game about subtracting small quantities from 15, or from any other teen number. The focus is on the relationship between addition and subtraction, a relationship that is highlighted by the use of triad notation during play. [This game first appeared in *Overcoming Difficulties with Number*, published by Sage.]

Subtraction Equations Game is a card game about the differences between pairs of numbers up to 20. It provides abstract practice for players who have already learned efficient calculation methods, including mental complementary addition and bridging. Each round ends with a bit of written practice in recording subtraction facts as equations.

The **Su Doku** puzzles provide abstract practice in number components. Both types are designed to reinforce the relationship between addition and subtraction. More Su Doku puzzles can be found on the games pages on this website [and many others, at various levels of difficulty, are published in *The Dyscalculia Resource Book*, published by Sage].

What is this game about?

The game shows how subtraction is related to missing number addition. It is about making equations, concretely, in which the **difference** between two quantities is 1, 2 or 3. The game forces players to compare different pairs of rods – each representing a number ≤ 10 – until the required differences are found.

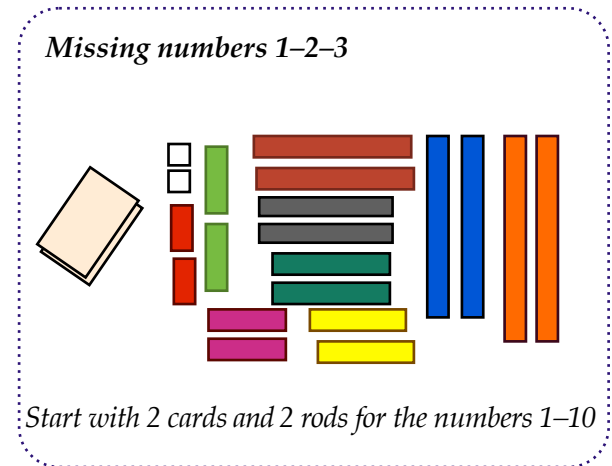
Equipment needed

- Two Cuisenaire rods each* for the numbers 1 to 10
- Two digit cards for each of the numbers 1 to 10

Rules

Take turns to take a card from the shuffled pack and then a rod to match. The aim is to align two rods, as in a missing number problem, so that the difference between the rods is either 1, 2 or 3. The winner is the first player who can create all three of the targeted differences, using six of their rods.

* It can be useful to mark three extra rods (a white, a red and a light-green) in some way (for example with a sticker) for either player to make use of temporarily during the game, for measuring only, i.e for checking to see whether the difference between two rods is one of the three target numbers.



An example of a winning hand

*This game, together with a demonstration video, appears in Ronit Bird's ebook 'Exploring Numbers Through Cuisenaire Rods' [Apple Books].
A demonstration video of the game can also be found on YouTube: https://www.youtube.com/watch?v=NXpNktY8_34*

What is the game about?

This game, for 2 or 3 players, highlights the connection between addition and subtraction by requiring players to express familiar number relationships both ways. The game focuses on the **key component facts** of the numbers up to 10, i.e. the doubles or near-doubles facts (e.g. the key facts of 4 are $2 + 2$; the key facts of 5 are $2 + 3$, etc), and on subtraction as **difference**.

Equipment needed

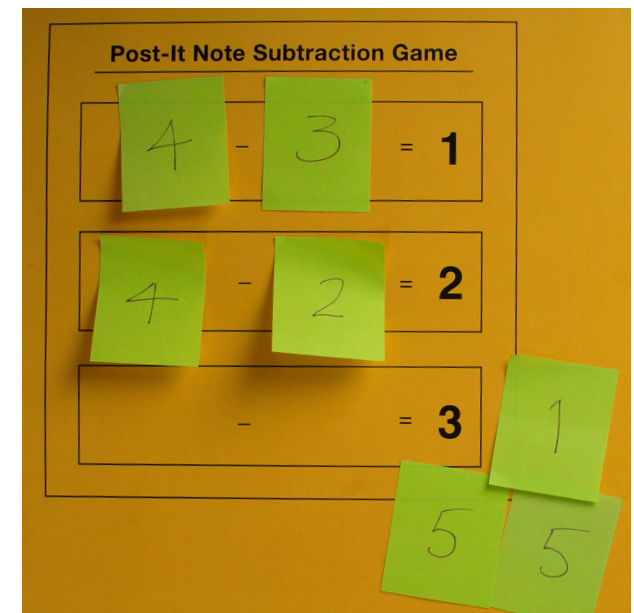
- A pack of cards with 4 cards for each of the numbers 2 to 10. Use dot pattern cards at first, before playing with digit cards.
- Small post-it notes (or pieces of card or paper) and a pencil.
- Each player sketches a 'game board' (as pictured) consisting of 3 rectangles with enough space for a post-it note on either side of a 'minus' sign. Write an equal sign at the right of each rectangle followed by 1 at the top, 2 in the rectangle below, then 3.

Rules

Take turns to pick up a card. On your turn, announce the key component fact about the number on the card, and express it as a subtraction before writing the answer on a post-it note. E.g. for 7, say: "The key components of 7 are 3 and 4, so 7 minus 3 is 4," before writing 4 on a post-it note (or say: "The key components of 7 are 3 and 4, so 7 minus 4 is 3," before writing 3 on a post-it note). With dot pattern cards, cover up with your hand the amount that you are taking away. Return the card to the bottom of the pack.

Whenever you have two numbers with a difference that matches one of the target numbers, 1, 2 or 3, arrange the numbers as a subtraction problem on your game board. You may rearrange your own post-it notes as often as you like.

The winner is the first player to use six post-it notes arranged so as to complete all three subtractions on the board, creating all three target numbers.



Can you see how this player could arrange her post-it notes to create all three target numbers?

What is this game about?

This is a subtraction game, designed to provide practice in splitting small numbers into smaller components – but into chunks, not ones! More often than not, the exchange will be of one rod <10 into two smaller rods, but in the lower photo you can see a player having to split a 10 in a more difficult subtraction.

N.B. Focus on the act of **partitioning** and the reasoning behind making every exchange, not on finding instant answers to individual subtraction questions.

Equipment needed

- Cuisenaire rods
- A frame or tray measuring 5 cm x 10 cm for each player (frames can be cut out of craft foam or kitchen sponge; trays can be made out of paper or card a little larger than required with the edges bent up)
- A 1–6 die

Rules

Players start with five orange rods filling their tray. (Optional: for a faster game, start with fewer rods, e.g. descend from 30, or from 25.)

Take turns to throw the die and remove from your tray the amount that matches the throw. It is important to do this as efficiently as possible, by making exchanges that involve as few component pieces as possible. Players are not allowed to use several single white cubes instead of a longer rod.

The winner is the first to empty their tray.



Start with Cuisenaire rods, a 5x10 cm tray or frame, and a 1–6 die.

On this turn, the player below must subtract 5. This will entail splitting a rod and making suitable exchanges: either exchange one of the 10s into two 5s, or into 8 and 2, so that 5 can be removed.



This game appears in Ronit Bird's 'Overcoming Difficulties with Number' [Sage].

What is this game about?

The game is about the kind of subtraction problem that would require decomposition if performed as column subtraction. The game provides practice in using **complementary addition** by **bridging through 10**.

Equipment needed

- Cuisenaire rods
- A frame or tray measuring 2 cm x 10 cm for each player
- A spinner with a base for numbers 11–15 and a 4–9 die
- Paper and pencil.

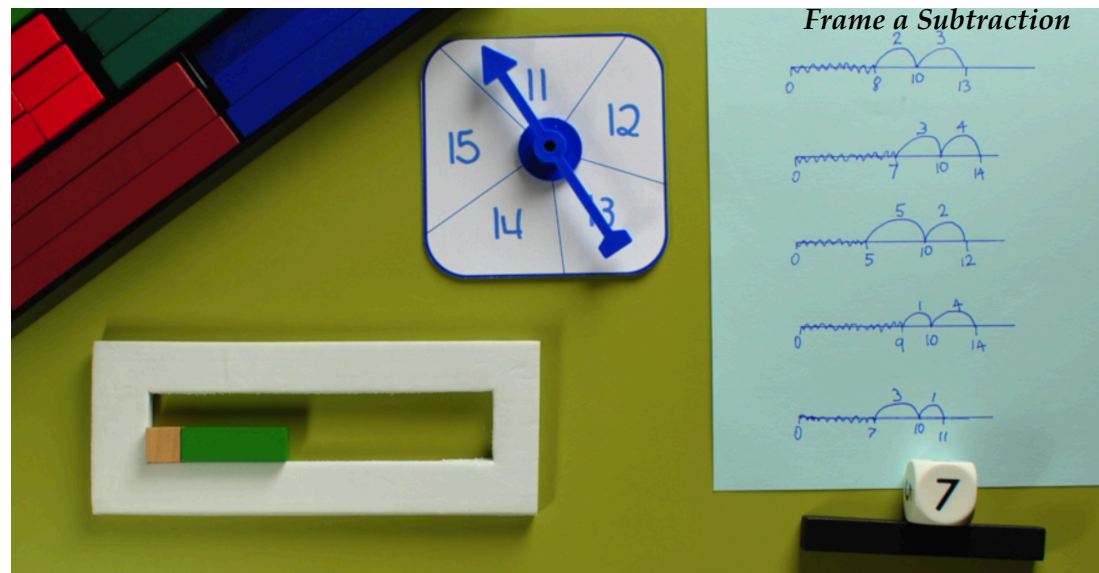
Rules

Start every turn with an empty frame. On your turn, spin the spinner and put two rods (one of which must be an orange 10-rod) to match the spin inside your frame. Now roll the die to find out how much to subtract. If you have enough units to leave the orange 10 rod whole (i.e. 15 minus 4 or 5, or 14 minus 4) that is the end of your turn. If not, you must demonstrate how to find the answer by exchanging the orange 10 rod for two smaller rods. Subtract, i.e. physically remove, one single rod to match the number on the die. As you perform the exchange and subtraction, explain aloud every step of the process. Record the bridging calculation on an empty number line as complementary addition (i.e by finding the **difference** and working **forwards** on the number line.)

The winner is the first player to perform and record 5 different subtraction calculations as complementary additions with bridging.

Variation

Go on to have an extra turn whenever your answer is 6 or 7 (this puts more focus on the harder calculations).



This player has just won the game, after subtracting 7 from 11 and recording the calculation as complementary addition on his fifth empty number line.

*This game appears in the 3rd edition of Ronit Bird's 'The Dyscalculia Toolkit Book' [Sage].
A demonstration video of the game is posted on YouTube: https://www.youtube.com/watch?v=NXpNktY8_34*

What is the game about?

This game for 2 players provides practice in both addition and subtraction and highlights the relationship between the two operations.

Equipment needed

A pack of 40 digit cards composed of 4 for each of the numbers 1 – 10.

Rules

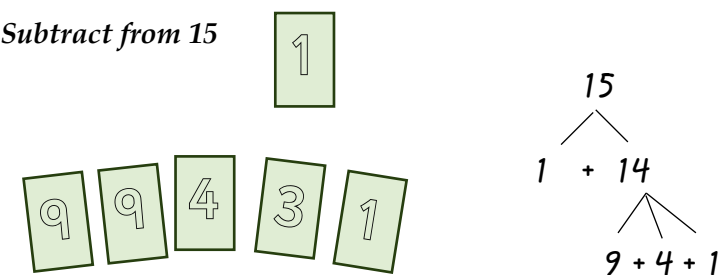
Shuffle the pack. Each player keeps five cards hidden in their hand, picking up new cards from the pack to replenish those that are used. Players take turns to lay down any card from their hand as a challenge. The opponent has to subtract the challenge number from 15 and then match the solution with any card, or combination of cards, from his own hand. E.g. if one player lays down a 4, the opponent must announce that “15 *minus* 4 is 11” before trying to create a total of 11 from the cards in his hand. If the opponent is successful, all the cards used to create 11, plus the original card showing 4, are placed in his winning pile. If unsuccessful, the challenge card goes into the challenger’s winning pile. Continue playing until there are no longer enough cards for players to maintain 5 cards in their hand. In some games, to ensure that the focus is on the connection between addition and subtraction, use triad notation to record the numbers that add up to 15, after announcing the subtraction fact from 15.

Variation

Agree on a teen number other than 15 as the starting point for the game.



Subtract from 15



If these five cards (above) are in my hand when my opponent plays a challenge card of 1 (top), I will say “15 minus 1 is 14” and can play 9, 4 and 1 from my hand, to win all four cards. I can use triad notation to record these facts as addition.

Can you see how I could win at least three cards on this turn if the challenge card happened to be 2, 3, 5, 7, 8 or 10? I could win two cards if the challenge card is 6. I could win nothing if the challenge card is 4 or 9.

What is this game about?

This game, for 2 or 3 players, provides practice in mental subtraction of pairs of numbers < 20 as well as some practice in recording equations formally in writing.

Equipment needed

A pack of 36 digit cards made up of 2 each for the numbers 1 to 9 and 11 to 19 (card templates are provided below). Paper and pencil.

Rules

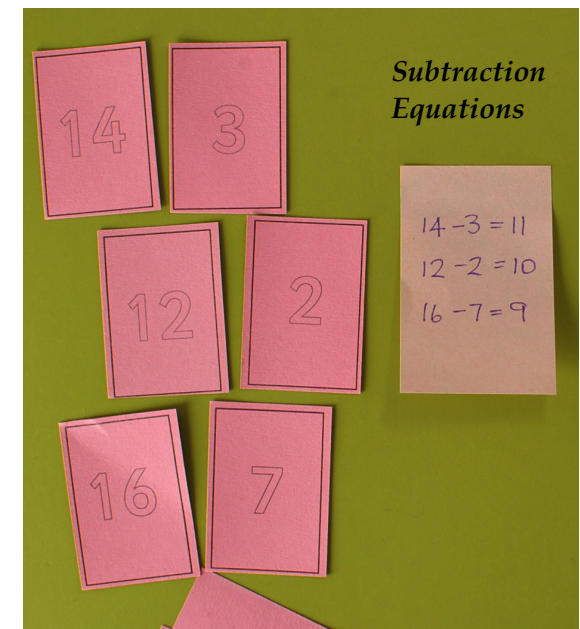
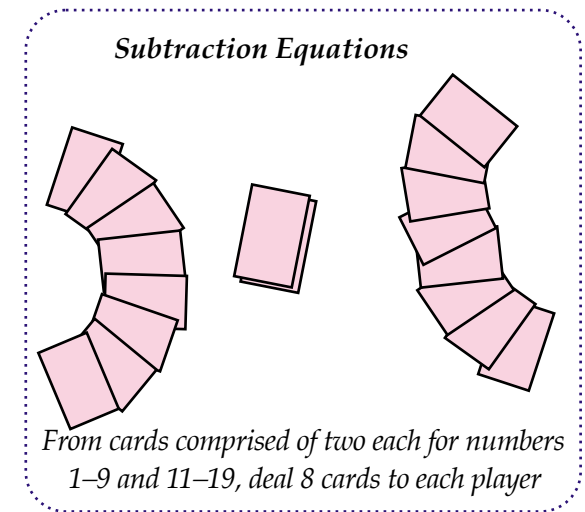
Shuffle the cards. Deal 8 cards to each player. Players must create three subtraction problems with six of their cards, the aim being solutions that create a run of 3 consecutive counting numbers. (N.B. zero is not a counting number.)

Each of the six cards represent either the subtrahend or the minuend (these are the two numbers at the left of the equal sign in an equation when the difference is at the right of the equal sign). No card may be used more than once.

Players write down their three subtractions and complete each equation by calculating and recording the answer. The round is won by the player whose solutions are any three sequential numbers in the counting sequence.

If both players can create three valid subtraction equations, the round is won by the player whose solutions have the highest values (e.g. differences of 15, 14 and 13 would win over solutions of 13, 12 and 11). If neither player can create three relevant equations, both players take a ninth card and try again.

Play 3 rounds.



An example of a winning hand

Su Doku Puzzles Fill in the numbers 1–6 (left puzzle) and 1–5 (right puzzle) so that each number appears once only in each row and in each column.

In the **Component Puzzle** at the left, the thicker grey lines enclose different components that must add up to the number at the top left of the enclosure. In the **Difference Puzzle** at the right, the thicker grey lines enclose two numbers with a difference that matches the number at the top of the enclosure.

Component Su Doku 1 – 6

7	11	6	7		5
				9	
8	5	9			5
		7		6	
8		7	2		11
3			10		

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Difference Su Doku 1 – 5

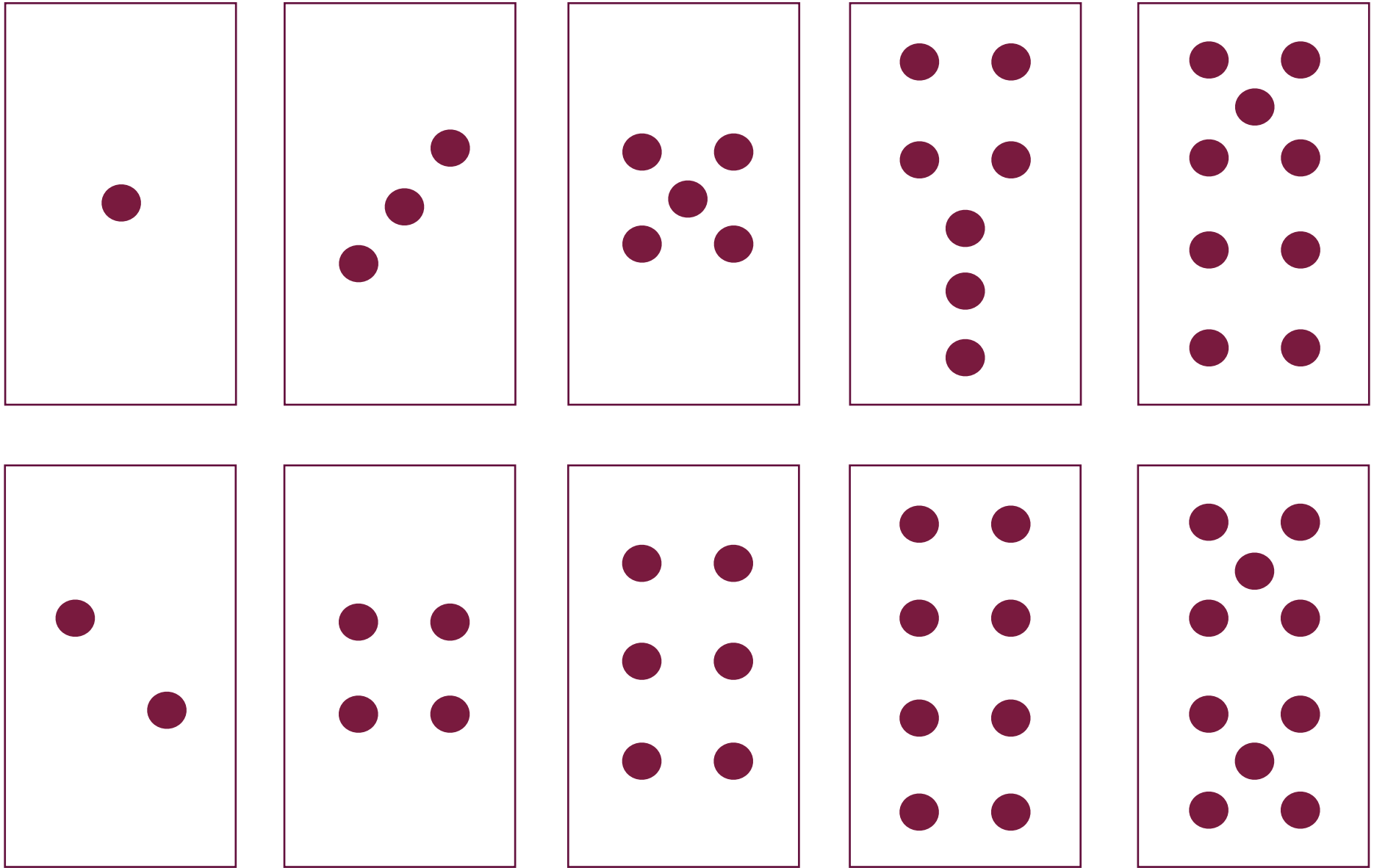
4	Difference of 3	Difference of 2
Difference of 2	Difference of 3	Difference of 2
Difference of 1	Difference of 1	Difference of 4
Difference of 1		Difference of 2
Difference of 3	Difference of 3	

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Many other Su Doku Puzzles, at various levels of difficulty, are published in Ronit Bird's 'The Dyscalculia Resource Book' [Sage]

Dot pattern cards

A pack has four of each card (Tip: To prevent show-through, print something on the back before laminating and cutting out)



1

2

3

4

5

6

7

8

9

10

1

2

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11

12

13

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18

19