Learning the Times Tables

There are some children who simply cannot learn their multiplication tables facts by heart, no matter how much effort they put into the task. Such children are often dyslexic or dyscalculic. Their memory is simply not capable of memorising the long lists of numbers, and since the sequence feels like just a string of sounds, without meaning, the lists often get mixed up. The result might be a recitation that slips from one table to another, or the unwelcome discovery that learning a new table wipes from their memory all traces of a previously-learned table. There is no point in trying to either bully or bribe such children into learning the tables facts by heart. They simply can't.

My solution to this problem is to teach pupils what multiplication tables mean and how they are created. This work leads to teaching specific strategies that allow the pupils to derive all the tables facts from a few key facts. As always, I start with concrete materials, namely Cuisenaire rods, and have the pupils work through carefully targeted activities until they are able to use visualisation, logic and reasoning to find answers to multiplication and division tables questions. In my first print book, *The Dyscalculia Toolkit*, one of the four main sections is devoted to foundation work on multiplication and division. In my second print book, *Overcoming Difficulties with Number*, two of the nine chapters deal with teaching and learning multiplication and division and a further two deal with the transition between concrete multiplication and division work and the purely abstract ideas inherent in long multiplication and division algorithms. My third print book, *The Dyscalculia Resource Book*, provides lots of multiplication and division puzzles (MAD puzzles) for children to practise the facts at various levels of difficulty. My latest book, the third in a series of ebooks for the iPad or Apple computer is *Understanding Times Tables*. It is entirely devoted to the subject and contains many demonstration videos.

The reason that I play tables games with my pupils is not in the hope that they will gradually learn to memorise the facts. They will not. Instead, I use the games as an enjoyable way of practising the reasoning techniques that I have previously taught them and that they fully understand but have not yet mastered. The important point is that you must provide the children with good strategies for finding the solutions, before playing these games. I hope you use my games, and any other tables games you know of, for enjoyment and untimed practice (obviously deriving a fact will take longer than just knowing it off by heart) in place of the endless and boring worksheets that children are so often asked to race to complete.

Various games to practise times tables

Introduction

The purpose of the games provided in this section is to practise mathematical **methods** for finding times tables facts. Children who don't have any difficulty memorising all 100 facts for the times tables up to 10 x 10, probably don't need extra practice. Children whose memory is not so reliable need a different kind of approach. They will begin to develop an understanding of the topic when they learn it through the **area model** of multiplication and division (see my various books for more details).

My recommended way of learning multiplication tables is to start with three key tables facts, namely the 2 x, 5 x and 10 x step of any table. These facts can be found by doubling (2 x), by place value (10 x) and by halving (half of 10 x is 5 x). All the other tables facts can be derived from these key facts through logic and reasoning based on a thorough understanding of the area model of multiplication and division. Children should be encouraged to practise finding answers as efficiently as possible: the fewer the calculation steps, the better.

The games provided below are:

Key Multiples Bingo [to practise the key tables facts]

The Star Challenge [to practise all the facts of a single times table]

Games to play with self-correcting cards [to practise the facts of a single table both as multiplication and division]

The Multiples Game [to practise the tables facts from 1 x 1 to 6 x 6]

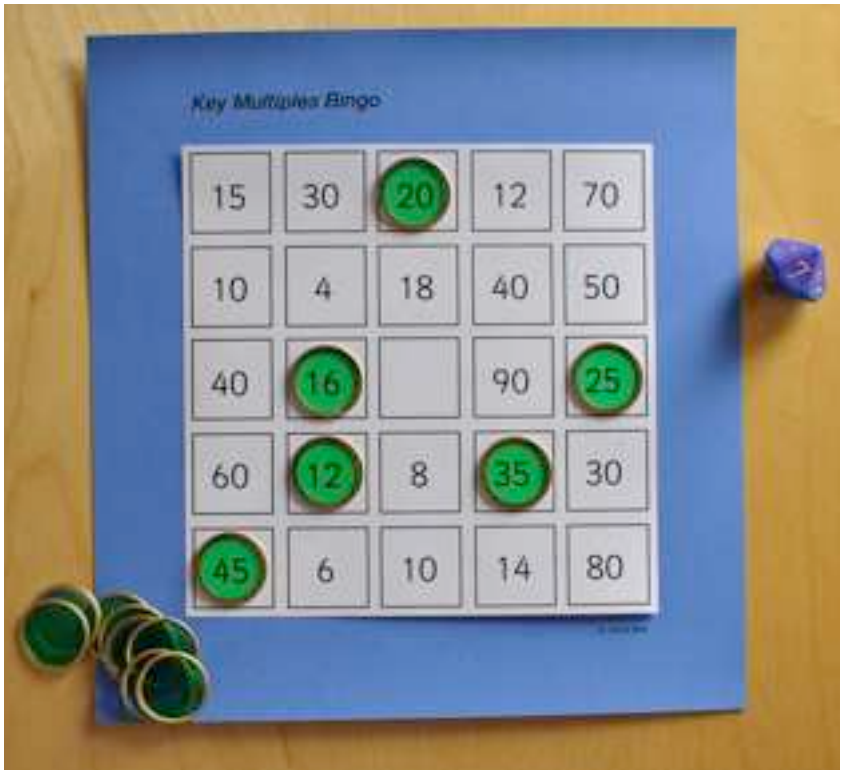
Products in a Row [to connect two related tables, e.g. 4 x and 8 x]

Tables Quartets [to practise harder tables facts, i.e. the 6 x to 9 x steps]

Key Multiples Bingo

What is the game about?

Practice in the key facts of all the tables up to 10 x 10 – i.e. the 2 x, 5 x and 10 x steps of any table, in a random order.



Equipment needed

A different board game for each player. Counters (preferably transparent) to fit the squares on the boards. A 10-sided die, or two ordinary dice on which the 6s have been covered by a blank sticker.

Rules

Take turns to throw the die. Throw again if you get a 1. Miss a turn if you throw a 0 or a 10. Announce the three key facts for the relevant table. For example, if you throw a 4, say the answers to 2 x 4, 5 x 4 and 10 x 4, in any order you please. Place a counter on any one of these three multiples of the die throw. If all three fact are already covered, you may place a counter on the middle square, but once this square is covered you will have to miss any turn in which the same situation arises.

The winner is the first player to place five counters in a row, either in a straight line or diagonally. Swap boards and play again.

This game appears together with a demonstration video in Ronit Bird's 'Understanding Times Tables' [iBooks]
It was first published in Ronit Bird's 'The Dyscalculia Resource Book' [Sage].
Game boards to download or print off can be found in the Games & Resources area of this website.

The Star Challenge

What is the game about?

This solitaire game takes its name from the little star-shaped cut-outs and cards I used when I made it. You can, of course, make cut-outs of any shape. The game provides practice in a single times table of your choice. It involves matching questions to answers, but without mentioning the word 'division'.

Equipment needed

Cut out 10 (or 12) star shapes from an A4 piece of cardboard. Tape the card to a backing A4 piece, leaving the top open, creating a cardboard sleeve.

Prepare inserts for the sleeve by trimming the edges of A4 sheets of paper to fit. Then write the products from a single table through the holes. Prepare several sheets for the same table by writing the products in a different order.

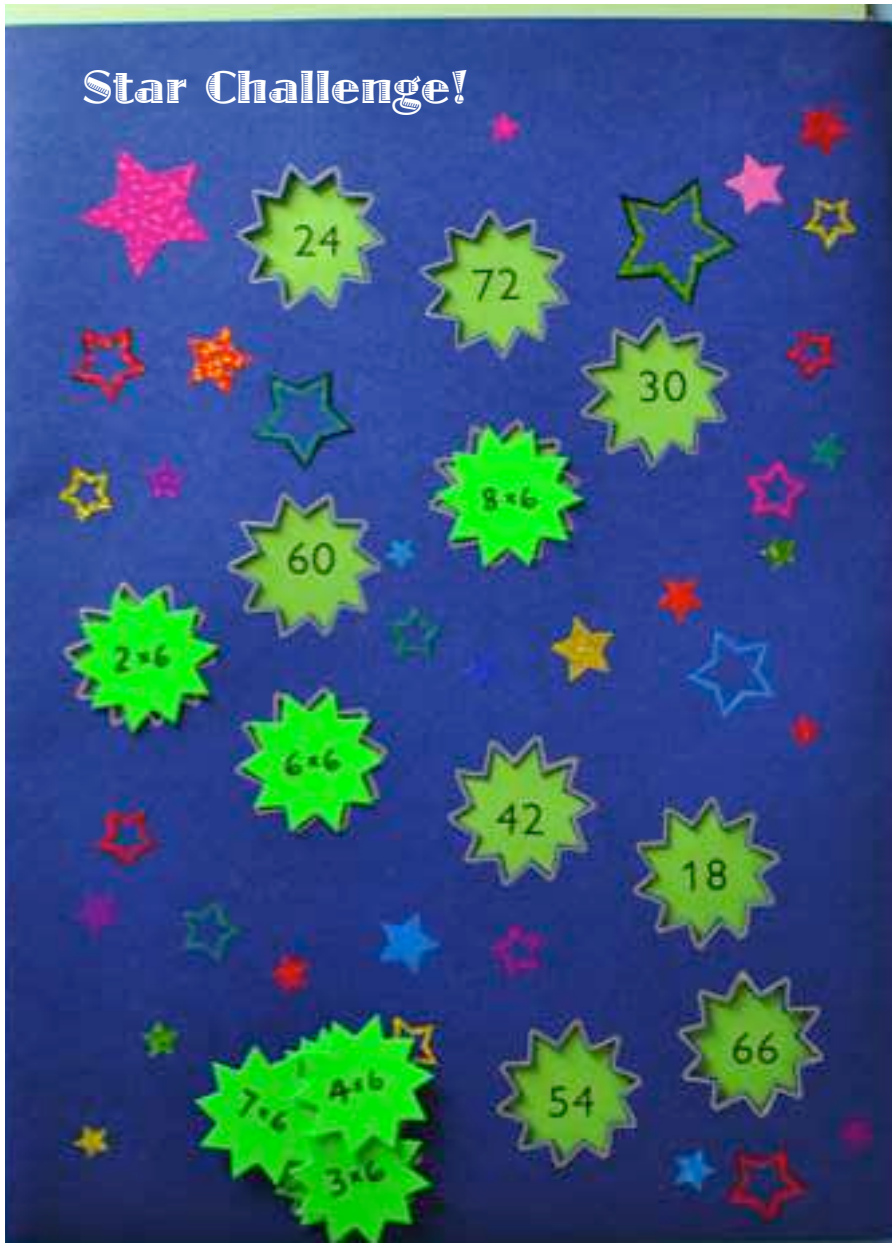
Use star-shaped cut-outs as cards. Label them 1 x, 2 x, 3 x, ... to 10 x or 12 x.

Rules

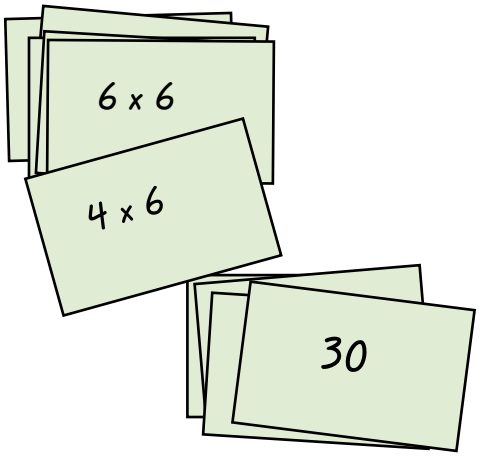
Shuffle the star cards and stack them in a pile. Set a timer (optional).

The player picks up the cards one by one and matches each card to one of the products, before moving on to the next card. When all the products (and holes) have been covered by a card, stop the timer. Check with an adult, or use a tables square, to make sure that each card is correctly matched.

Although it can be fun to try to beat your own record and complete the challenge as fast as you can, using good strategies (and no counting!) is much more important than speed.



Self-correcting card



What are they?

A set of 10 cards, of any size. One side should show the question and the other side the answer to that question, within a single times table. Such cards can be bought. But writing out the questions and answers is good practice in itself so it's best to just have a set of 10 (or 12) laminated cards. Each time one of these games is played, the child can get extra practice while preparing for the game by working out and recording the relevant numbers on the cards with a dry-wipe pen.

GAME 1

Use the question cards for learning or revision. Try to answer the questions, first in order, then shuffled, then against the clock.

GAME 2

As for Game 1, but with the answers face up. Knowing which times table is being practised, look at the product and state what question lies on the other side of the card. E.g. in the 3 x table, read "15" and say "5 times 3" before turning over to check.

A harder variation is to read the question as division. E.g. in the 3 x table, say "15 ÷ 3 is 5" or "15 ÷ 5 is 3" before checking.

GAME 3

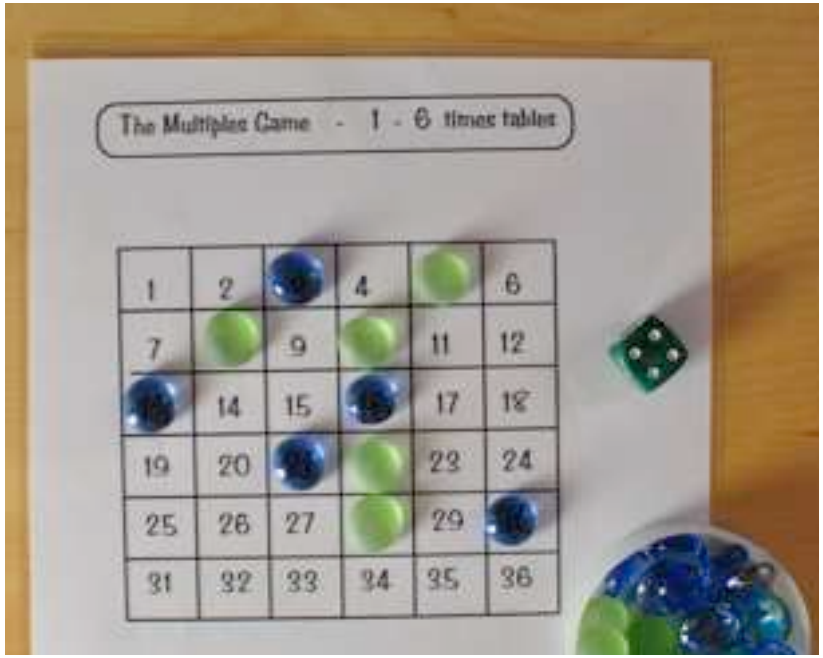
With two sets of cards for the same times table, lay out one set with the questions face up, and the other set, in a separate group, with the answers face up. At first the question cards can be laid out in order; later both sets should be shuffled first. The game is played against the clock, or against an opponent, the aim being to match questions and answers as quickly as possible.

GAME 4

A game for two players, each with their own set of cards for the same times table. One player stacks the shuffled cards so that the questions are facing up; the other player stacks the shuffled cards so that the answers are facing up. Play a game of Snap.

These games appear in Ronit Bird's 'The Dyscalculia Toolkit' [Sage]

The Multiples Game



What is the game about?

The game targets the tables facts from 1 x 1 to 6 x 6. It helps children remember the meaning of the word 'multiple'. It connects multiples to the table from which they originate, rather than the other way around, leaving children to choose whether to think in terms of multiplication or in terms of division. The game also reinforces the fact that 1 is a factor of any number.

Equipment needed

A game board used by both players with the numbers from 1 to 36 set out in a 6 by 6 grid. Counters in two colours (a different colour for each player) that fit the squares on the board. An ordinary 1–6 die.

Rules

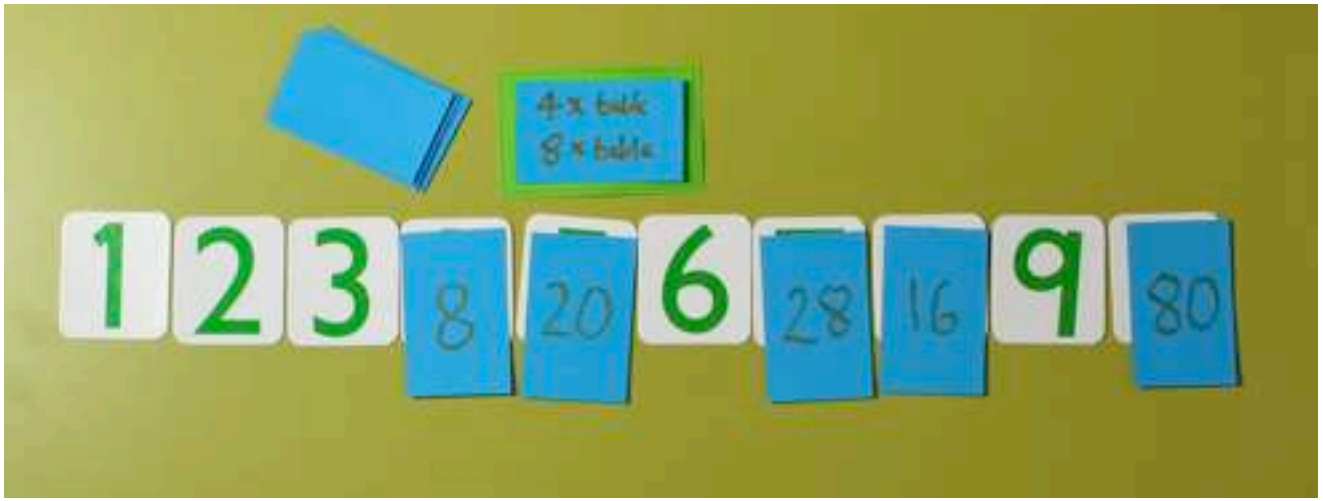
Take turns to throw the die and put a counter on one of the multiples of the number you threw, provided the number is not already covered by a counter. But, no player may place a counter in the top two rows, i.e. the numbers up to 12, during their first turn of the game. Players should use the word multiple often (e.g. say "15 is a multiple of 3").

The winner is the first person with 4 counters in a row, horizontally, vertically or diagonally.

This game appears in Ronit Bird's 'The Dyscalculia Toolkit' [Sage] and in Ronit Bird's 'Understanding Times Tables' [iBooks]
Game boards to download or print off can be found in the Games & Resources area of this website.

What is the game about?

The game provides practice in the tables facts of a pair of related times tables at the same time. It focuses on products, but without mentioning the word 'division'. It highlights the connection between the table of a number and the table of its double, e.g. that every other step of the 2 x table can be matched by a step from the 4 x table, etc.



Equipment needed

10 cards for each player on which the numbers from 1 to 10 are shown; these 'base cards' are set out in a row, face up in front of each player. 20 cards on which are written the products of the two related tables, e.g. the 2 x and the 4 x tables, or the 5 x and the 10 x tables, or the 3 x and the 6 x tables, or the 4 x and the 8 x tables. The product cards are shuffled and placed face down in a pack used by both players.

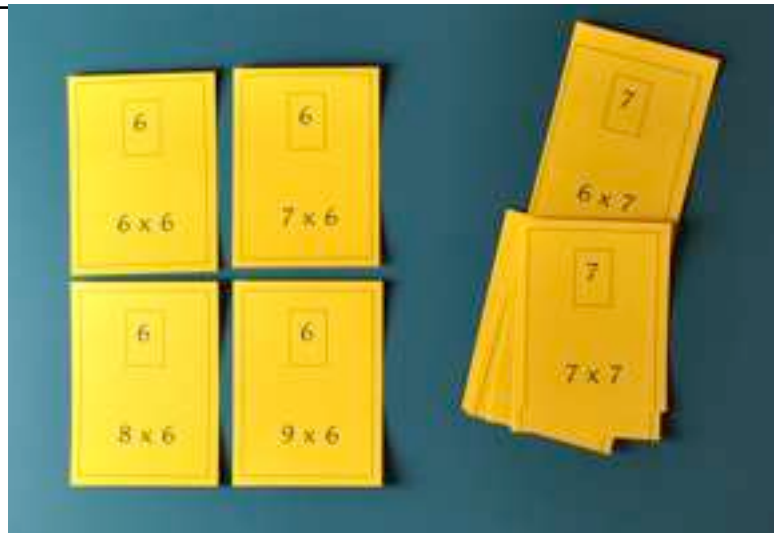
Rules

The two tables being practised must be identified and noted in writing before play starts. Players take turns to pick up a product card and announce one relevant tables fact to match the number written on the card. E.g. if the targets are the 4 x and the 8 x tables (as in the photo above), a card bearing the number 16 can be called as 2 x 8 or as 4 x 4 (but not as 1 x 16). The player now uses the card to cover one of his own base cards and can choose to cover either the 2, the 4 or the 8. Product cards cannot be moved once they are placed. If a card cannot be placed, return it to the bottom of the pack. The winner is the first player to cover 3 base cards in a row.

Variation

Create a pack of 40 product cards by making two cards for each answer and play the game with either 2 or 3 players. The winner is the first to cover 5 base cards in a row.

Tables Quartets



What is the game about?

This game, adapted from the traditional card game sometimes known as 'Go Fish', is for 2 players. It provides practice in the four hardest facts of a times table, namely the 6 x, 7 x, 8 x and 9 x steps of any table.

Equipment needed

28 cards in all, composed of 4 cards for each of the times tables 3 to 9 inclusive. On each card, the table from which the question comes should appear above one of the four harder questions without the answer (see the photo at the right).

Rules

Shuffle the cards and deal out five to each player to hold in their hand, hidden from their opponent. The first player asks the other for a card that he does not yet have but that belongs to a quartet from which he currently holds at least one card. When making the request, the player should announce the table and must give the product as well as the question. For example, if Player A has the 7 x 9 and the 8 x 9 cards in his hand, he can ask for one of the other cards from the quartet by saying, "In the 9 times table, do you have 6 x 9 which is 54?" or "Please give me 9 x 9, which makes 81." If player B has the card, he must give it to Player A who adds it to the cards in his hand and may go on to ask another question. If a player makes a mistake by saying the wrong product, the supervising adult must immediately tell the other player that the question is invalid and should therefore be ignored.

A player whose question is answered by the surrender of a card, goes on to have another turn and keeps on having turns as long as he is successful. Whenever the answer received is "No" the questioner picks up a card, signaling the end of his turn.

The winner is the player who has collected the most complete quartets when the cards run out.

Variation

Play with 3 players, adding an eighth quartet of cards for the 11 or the 12 times table to create a pack of 32 cards. The players do not play strictly in turn. Instead, play passes to the player who said "No" to the previous player's question.

This game appears in Ronit Bird's 'Understanding Times Tables' [iBooks]. Templates for the cards can be found in the Games & Resources area of this website.