Sumdog Pathway to Multiplication Success

Using Sumdog to build **conceptual understanding** of multiplication and number in order to increase **fluency, speed, accuracy and retention**.

Your pathway to developing your students' multiplicative fluency!

Contents

Introduction

Our multiplication mission

At Sumdog, we want to develop children's number sense and multiplication fluency. That is why we have created the Sumdog pathway to multiplication success – a scheme of learning covering multiplication for Grades K–4, designed to build retention *and* conceptual understanding.

Familiarity and proficiency with multiplication facts free up children's working memories and enable them to better apply their math skills to more complex problems. A strong number sense along with multiplication fact fluency lays the foundations for concepts such as division, fractions and more abstract algebra, in both educational and 'real-life' contexts.

Understanding or memorizing?

Times table facts give children the opportunity to see for themselves the beauty within numbers and the complex patterns and relationships that lie within them. By learning to multiply, they can develop a deeper understanding of our number system – the grouping of sets, arrays, skip counting, doubling, halving, repeated addition and many other mental agility strategies.

At Sumdog, we believe recall and fluency in mutliplication facts come with a deep conceptual understanding. Our fun, engaging, low-stakes practice and motivational rewards give children the opportunity to gain that understanding – by exploring, practicing, making mistakes and enjoying the beauty of numbers.

Sumdog's Teaching Tools for Multiplication

Sumdog has created two tools to help build multiplication fluency. The **multiplication practice tool** has been designed so that teachers can set differentiated tables practice for the children to complete in any of our games. The second tool, the **Multiplication Tables Check** (MTC), is more like an assessment, and enables teachers to see more quickly which tables or multiplication facts need extra practice.

The MTC follows the following format:

+ **The test checks multiplication recall with 25 questions.**

+ **The pupil has six seconds to answer each question.**

+ **While pupils do not see their results, they receive 5 coins per correct answer and will see the total number of coins earned at the end.**

+ **The test focuses on tables 2–12, with a special focus on 6, 7, 8, 9 and 12 times tables.**

Using our multiplication tools alongside our pathway to multiplication success will prepare, support and equip your students to confdently, accurately and fluently multiply so that they can tackle higher level problems.

This will not be achieved by simply memorizing facts but through progressive, conceptual development of understanding that sets them up for Grade 5 and beyond.

And the best part is it's free!

The Sumdog multiplication tools are free to all users alongside our pathway to multiplication success. Furthermore, our free heat map score report provides insight for teachers on which students require additional support and helps identify next steps for learners. This will allow you to plot a non-stressful pathway for your students to build confidence, recall and fluency that they can effectively apply to future assessments.

So in summary, our multiplication tools:

✔ Are free of charge for all users.

✔ Assess multiplicative fluency in a fun and engaging way.

✔ Include free insights and heat maps to identify next steps in learning.

The Sumdog Pathway to Multiplication Success

By following the Sumdog pathway to multiplication success, you will use our platform as a way to bring fun into daily fluency practice. Our standards-aligned Sumdog skills provide a means to naturally develop greater recall and understanding of multiplication facts, using our broad range of progressive and varied question content. The Sumdog pathway to success in multiplication can be used alongside any existing schemes of work or resources you use within your classroom, and is certainly not designed to replace them. Instead, the pathway outlines how Sumdog can be used to complement, supplement and enhance your existing curriculum.

Unlike other ed-tech companies, Sumdog does not just provide opportunities to practice and develop recall speed and fluency, as memorization of multiplication facts learned by rote can be counter productive. Students may have memorized their times tables, but would they necessarily know that 4 x 8 is the same as 8 x 4 without remembering each fact individually? At Sumdog, we build **conceptual understanding** of multiplication from Kindergarten and provide you with a range of tools to build on this foundation. This multiplication pathway will give your students the opportunity to explore strategies, inquire and problem solve, but will also develop their **confidence, fluency, accuracy and speed**.

Conceptual understanding

+ Progressive questions that develop strategies
+ Commutative, associative and distributive properties explored
+ Teacher reporting and insights
+ In-game practice with thinking time
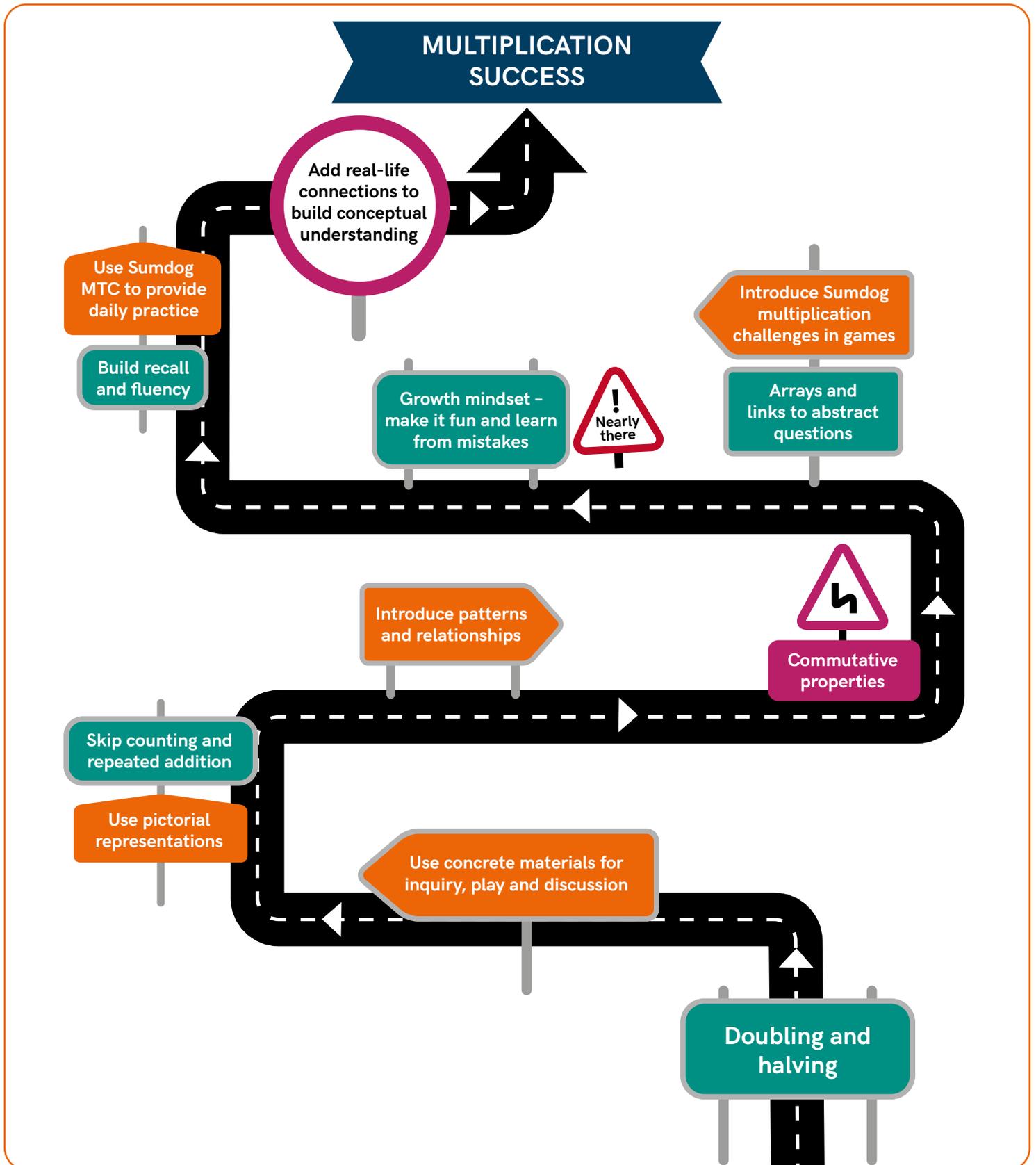+ Low-stakes standards-aligned assessments

Retention

+ Timed daily practice opportunties
+ Sumdog MTC tool to build speed, accuracy and fluency
+ Build student confidence with Sumdog coins for garden, house and avatar personalization
+ Sumdog competitions, challenges and contests to motivate and inspire

The Sumdog Pathway to Multiplication Success is based upon these simple steps:

- Relate multiplication to what students have already mastered – addition.
- Have students start with easy multiples of zero and one.
- Use multiplication tables to have students identify patterns, especially with easier numbers.
- Highlight the commutative property and how it can make things easier.
- Introduce the the associative and distributive properties to strengthen mental math skills.

The Sumdog Pathway to Multiplication Success – A Visual Guide

MULTIPLICATION SUCCESS

Add real-life connections to build conceptual understanding

Use Sumdog MTC to provide daily practice

Build recall and fluency

Introduce Sumdog multiplication challenges in games

Growth mindset – make it fun and learn from mistakes

Nearly there

Arrays and links to abstract questions

Introduce patterns and relationships

Commutative properties

Skip counting and repeated addition

Use pictorial representations

Use concrete materials for inquiry, play and discussion

Doubling and halving

Mathematical focus

The principal focus of mathematics in Grades K-2 is ensuring the deep development of counting and cardinality, fluency with whole numbers, and place value. In this grade band there is a strong emphasis placed on concepts, skills and problem solving related to addition and subtraction.
By the end of Grade 2 students understand equal groups and sums of equal addends, building the foundation of multiplication.

Introduce patterns and relationships

Commutative properties

Skip counting and repeated addition

Use pictorial representations

Use concrete materials for inquiry, play and discussion

Doubling and halving

Grades K-2

The first half of our Sumdog learner journey focuses on the key principles of Grades K-2.

+ **Developing learner confidence through our fun and engaging games.**

+ **Increasing fluency through regular Sumdog practice, standards-aligned focus skills for challenges* and easy-to-use pictorial representations to support and scaffold learning.**

+ **Supporting teachers to build on learning organically, in line with the requirements of state standards.**

Please note that Premium features referenced in this framework are indicated with an asterisk (*).

Sumdog Pathway to Multiplication Success – *Alignment to standards for Grades K–2*

- Know and count sequences (count by 1's and 10's).
- Count to tell the number of objects.
- Compare numbers.
- Understand addition as putting together and adding to, and understand subtraction as taking apart and taking from.
- Understand and apply properties of operations and the relationship between addition and subtraction.
- Extend the counting sequence (skip count by 2's, 3's, 5's).
- Understand place value to add and subtract.
- Work with equal groups to gain foundations for multiplication.
- Identify and describe arrays.

KINDERGARTEN – GRADE 2 – *Sumdog features*

Questions on Sumdog such as the below begin to introduce the idea of sets and groupings of objects. Furthermore, arrays are made up of rows and columns which are commutative in nature. There are 100s of iterations of each Sumdog question, giving your students plenty of practice of concepts within the games they play.

How many?
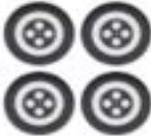
| 5 | 4 | 14 | 3 |

Next question

Please note that Premium features referenced in this framework are indicated with an asterisk (*).

For children to engage fully with their learning at this stage, they should also be equipped with the vocabulary necessary to make connections and build their metacognition. Opportunities to explore and inquire around their learning in practical ways can lead to a deeper understanding of number.

> For example: 3 x spoonfuls of sugar, 2 x chocolate buttons per child.
>
> **How many sets?**
> **How many (how much) altogether, per, each?**
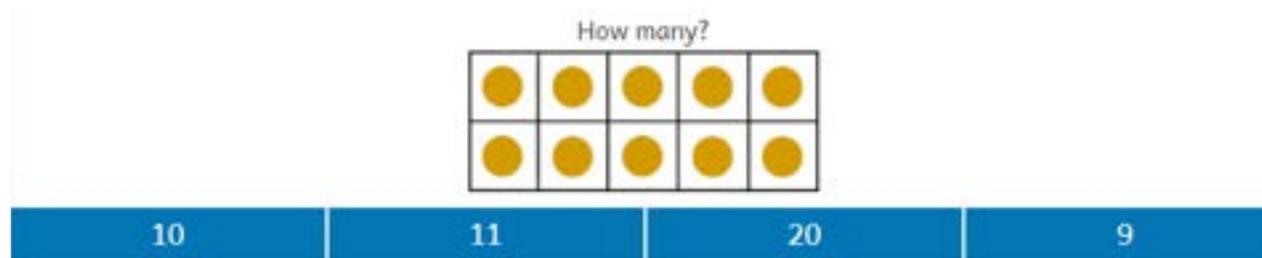
Questions such as the above introduce the commutative principle in multiplication, i.e. a x b and b x a are equal, 2 lots of 5 are the same as 5 lots of 2. Why not display a Sumdog question on your smartboard using the Question Viewer and begin these rich discussions around arrays?

At Sumdog, we would encourage the use of concrete materials throughout all stages of mathematics to allow students to manipulate, explore and investigate the patterns and relationships physically, before moving on to Sumdog practice activities. This process can be achieved by applying a play approach and by integrating Sumdog into the everyday classroom environment at an early stage.

> **Sumdog Assessment Opportunity***
>
> Our pre-made assessments* group our questions to cover and assess state standards for Grades K-8.
> They provide a means to assess student progress in a low-stakes, formative way and familiarize children with the process of completing assessments online outside of our games. The reporting and insights that our assessment reports provide can inform your teaching as you take the next step in our pathway.

Please note that Premium features referenced in this framework are indicated with an asterisk (*).

At this stage, you can begin to formally introduce the concept of doubling and halving to children, increasing the use of skip- counting and building familiarity with simple multiplication facts.

2 + 2 + 2 + 2	2 + 2 + 2 + 2 + 2 + 2	10 + 10 + 10 + 10 + 10	2 + 2 + 2 + 2 + 2

Sample questions such as the above begin to expand on the use of arrays in developing the conceptual understanding of multiplication.

We recommend still using concrete materials within the classroom to support this understanding, but as the children develop their metacognition abilities you can begin to expand and challenge their thinking around the concepts they have learned by posing questions verbally. For example:

I am not sure whether 2 x 5 is the same as 5 x 2?

As always, you can set specific focus skills on Sumdog or let our adaptive learning algorithm adapt to your students. Sumdog questions such as the following example help cement the foundations of multiplicative relationships. In turn, this leads to the development of mathematical language skills to communicate those foundations.

2 groups of 6

12 + 12	6 + 6 + 6	6	6 + 6

Next question

Please note that Premium features referenced in this framework are indicated with an asterisk (*).

As we begin to introduce doubling and halving children become aware of the scaling properties of multiplication and the repeated aggregation of numbers. Children begin to make the connection that unlike addition where they increase a quantity by a certain amount, with multiplication they are increasing a quantity by a scaling factor. For example:

> **If I have 4 sets of 2 counters then how many counters altogether?**

To summarise, teaching the state standards at Grades K-2 is in large part about developing students' confidence with number. Sumdog is the perfect platform to set low-stakes practice to bridge the gap between concrete materials and pictorial and abstract representations of number.*

Ideas for using Sumdog effectively to build fluency in grades K-2:

- Display our sample questions on your smart board using the Question Viewer and use these as the basis to develop metacognition and the vocabulary of multiplication as a class.
- Set challenges on specific focus skills for use in the classroom and at home, making use of our extensive teaching reports to identify gaps in multiplication recall and inform next steps.*
- Make use of our low-stakes pre-made assessments to formatively assess your students' understanding and use our enhanced reporting to track and monitor progress.*
- Encourage play, inquiry and the use of concrete materials in your classroom, and begin to connect concrete arrays to Sumdog pictorial questions. Most of our questions are read-aloud at this stage.
- Why not set your own, fun classroom competition or challenge? You can choose how many questions the students answer and reward them for their effort with coins to spend in their Sumdog house and garden.

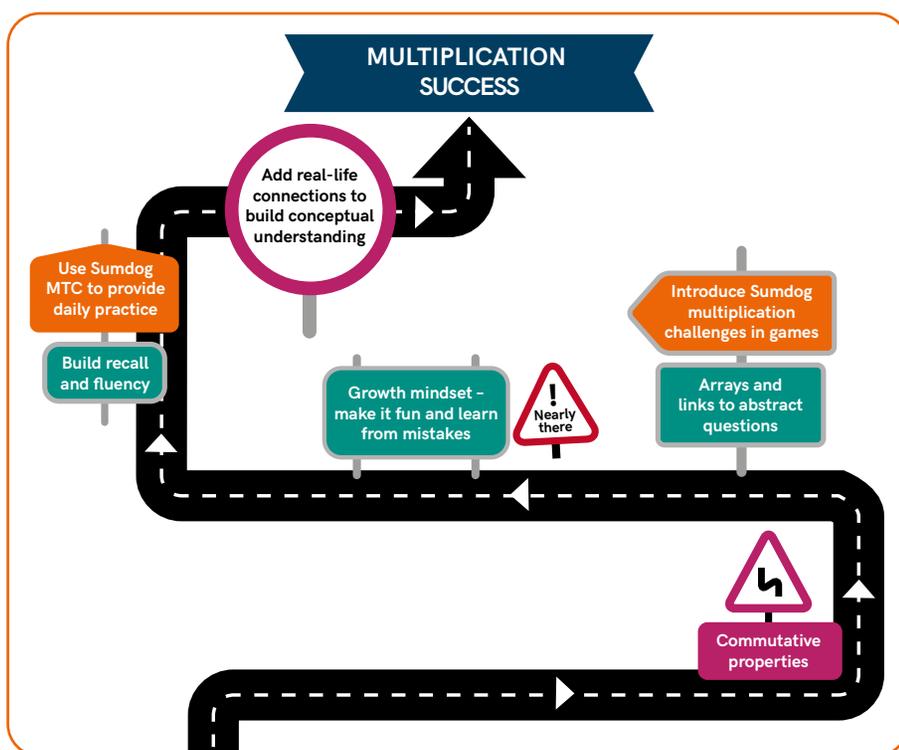Please note that Premium features referenced in this framework are indicated with an asterisk (*).

Grades 3-4 – Mathematical Focus

Mathematical focus
The principal focus of mathematics teaching in Grades 3–4 is ensuring that students develop understanding and math fact fluency with multiplication and division, and can identify patterns in arithmetic which lead to work on fractions and decimals. By the end of Grade 3, students possess strong multiplication fact fluency with a strong understanding of their times tables up to and including the 12 times table and should be able to show precision and fluency in their work.

MULTIPLICATION SUCCESS

Add real-life connections to build conceptual understanding

Use Sumdog MTC to provide daily practice

Build recall and fluency

Introduce Sumdog multiplication challenges in games

Growth mindset – make it fun and learn from mistakes

! Nearly there

Arrays and links to abstract questions

Commutative properties

As students continue their Sumdog learner journey, we begin to focus on the key principles of Grades 2-3:

+ **Introducing and expanding on the commutative properties of multiplication.**

+ **Building recall and fluency through the use of the Sumdog MTC tool and real-life connections.**

+ **Encouraging a growth mindset approach to learning; children are going to make mistakes in their recall and should be reminded that this is OK.**

Please note that Premium features referenced in this framework are indicated with an asterisk (*).

Sumdog Pathway for Multiplication Success – *Alignment to standards for Grades 3–4*

- Represent and solve problems with multiplication and division.
- Understand properties of multiplication and the relationships between multiplication and division.
- Multiply and divide within 100.
- Understand concepts of area and relate area to multiplication and to addition.
- Gain understanding with factors and multiples.
- Analyze patterns in numbers.
- Fluency in multiplication of single and multi-digit numbers.
- Perform all 4 operations with single and multi-digit whole numbers.

GRADES 3–4 – *Sumdog features*

By Grade 3 children will be familiar with the Sumdog platform – they will likely have used the coins they have been earning to decorate their house and garden, and will be used to taking part in school competitions and challenges and nationwide contests.

This stage presents an ideal opportunity to begin to introduce the Sumdog MTC. If you can build their confidence using the Sumdog MTC, then you are setting your students up for success in other areas of numeracy and maths.

Your students do not need to worry, panic or stress as Sumdog is a familiar environment, but will still give them the opportunity to practice their recall and build fluency, as well as enabling you to identify the next steps in their learning. If however you would rather set in-game practice, then you can use the free multiplication practice tool to set targeted work for your students.

> **We make it easy for you to differentiate multiplication practice for your students.
> Find out how on the next page!**

Please note that Premium features referenced in this framework are indicated with an asterisk (*).
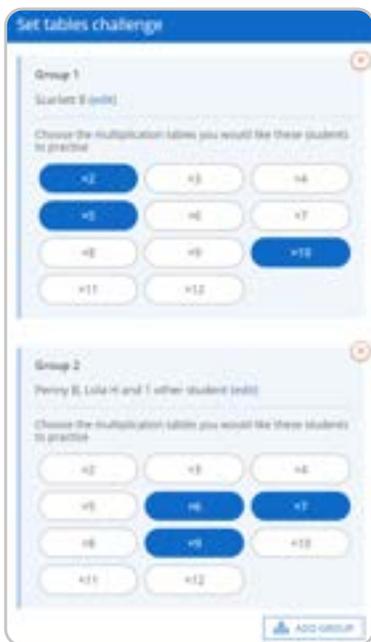
Using our enhanced student chooser, you can select which tables you want individual students to practice – allowing you to subtly differentiate the learning in a supportive context that doesn't make any student feel inferior.

From your students' perspective, they are simply playing Sumdog, but you know the specific tables that you have set for each student or group.

> **At Sumdog we continue to give you the tools to increase your students' confidence as they build their fluency.**

Using our standards-aligned Sumdog skills and adaptive learning algorithm, we expand the knowledge gained from arrays and begin to make direct links to multiplication and the mathematical language that has been developed in Grades K-2. Remember, our questions have 100s of iterations, so the potential for practice is enormous!

Please note that Premium features referenced in this framework are indicated with an asterisk (*).

At this stage, the understanding of multiplication as repeated addition is well established through play, inquiry and concrete and pictorial representations of numbers, and your students will have had some exposure to their 2, 5 and 10 times tables. Our questions at this level will begin to encourage children to spot patterns and relationships, using questions formats such as missing numbers and abstract representations of questions.

$$10 \times \boxed{?} = 30$$
$$\boxed{?} \times 9 = 27$$

3	18	1	5

Related to 12 = 3 × 4?

12 = 4 ÷ 3	12 ÷ 4 = 3

Sumdog's question content also begins to build on the commutative foundations from Grades K-1 and introduce the laws of associative and distributive properties.

> **Commutative – 5 x 28 is the same as 28 x 5 = 140**
>
> **Associative – (5 x 14) x 2 = 140**
>
> **Distributive – (20 x 5) + (8 x 5) = 140**

Please note that Premium features referenced in this framework are indicated with an asterisk (*).

Understanding these properties highlights differing strategies for children to increase their mental agility in answering more complicated multiplication questions, within real-life contexts in particular.

A store has 8 boxes of eggs. There are 8 eggs in each box. How many eggs will there be altogether?

| 8 × 8 | 16 × 8 | 8 − 8 | 8 + 8 |

> **Remember – Sumdog is about more than just memorization and practice.**
>
> **We help you to develop your students' multiplication fluency and understanding, leading in turn to speed, accuracy and fluency.**

7 x 10 =

The Sumdog MTC, multiplication practice and sample questions are ideal components to incorporate into your lesson planning, classroom environment and home learning opportunities. Using our platform will support your teaching of multiplication fluency and provide the opportunity for low-stakes practice that is not time-pressured or demotivating. Furthermore, beginning to use the Sumdog MTC in Grades 3 and 4 allows you to provide your students with the opportunity to apply their knowledge and build their confidence as they enter later grade levels.
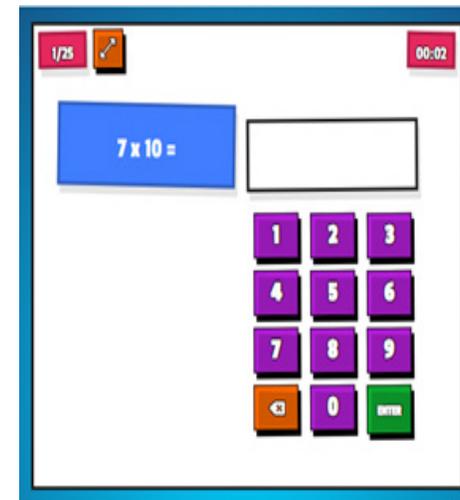
As the Sumdog pathway to multiplicative fluency reaches its destination at the end of Grade 4, it is now important that your students can recall all their multiplication facts to 12 x 12. For some students, we know this can seem a huge milestone but we hope that by following our structured approach the foundations have been laid and that they will be confident in recalling and using their times tables. The combination of the Sumdog MTC and our competitions*, challenges*, contests and low-stakes assessments* can continue to give you opportunities to direct and focus learning and for the children to continue to build confidence, fluency and recall.

Please note that Premium features referenced in this framework are indicated with an asterisk (*).

At Sumdog, we believe that in order for children to experience continuous development and success in mathematics, the groundwork must be laid from Kindergarten onwards and our platform has been designed to support this.

There will of course be students in Grade 4 who are still struggling to grasp certain multiplication concepts, and Sumdog's targeted practice can function as an early intervention solution to get them back on track. We would however also recommend that you:

- **Provide students the opportunity to build on their confidence with ad-hoc methods of tackling multiplication.**
- **Provide them with plenty of practice in mental multiplication by 1, 2, 5 and 10.**
- **Make explicit the patterns and relationships within multiplication.**

When a student is struggling, use Sumdog to encourage and motivate them to practice their times tables and use your in-class teaching to highlight the particular areas and strategies you want to focus on. These types of patterns and relationships provide the basis for student inquiry-based learning and the development of metacognition.

For example:

- There is no 1 times table to learn as the product is the same as the original number, reducing the number of facts to learn.
- The 11 times table builds on the 1 times table and the duplicating of the tens and unit digits means it is one that students often find easier.
- The 2 times table is doubling and through the use of concrete materials in Grades K-2 alongside skip-counting methodologies students should be familiar with this.
- Learning times tables in pairs can make it easier for children, particularly if they have the conceptual understanding of commutative laws that Sumdog has been building, e.g. 3 x 7 = 21 and 7 x 3 = 21.
- An understanding of squared numbers can also support students, as well as an appreciation of multiplication as repeated addition, e.g. if you know 3 x 8 is 24 then you can work out 3 x 9 is 27.
- The 9 times table has a very distinctive pattern as the unit digit goes down by 1 each time.
- Answers in the 5 times table end in a 5 or a 0.
- Odd factors x odd factors = odd products, odd factors x even factors = even products, even factor x even factor = even product.

Please note that Premium features referenced in this framework are indicated with an asterisk (*).

The following Grade 4 questions clearly show the progression within our product as we encourage students to make connections to times tables for themselves and build their understanding of patterns and relationships around multiplication facts.

Is the same as?

2 × 3 + 3 × 5	3 × 3 + 3 × 5	5 + 15	2 × 3 + 2 × 5

What is the same as 2 × 4 × 5?

8 × 6	9 × 5	2 × 9	2 × 20

We continue to create real-life connections and scenarios that allow students to apply their knowledge of multiplication to familiar contexts, enabling them to see how multiplicative fluency will continue to be a valuable asset.

Sophie earned 9 points per question and answered 4 questions. How many points did she earn altogether?

9 × 36	13 × 4	9 × 4	36 × 4

Make 63:

9 ÷ 8	9 × 7	8 × 7	10 ÷ 7

Please note that Premium features referenced in this framework are indicated with an asterisk (*).

$$2 \times 4 \times 8 = \boxed{?}$$

| 2 × 8 = 16 | 8 × 12 = 96 | 2 × 32 = 64 | 12 × 8 = 96 |

Related to 9 × 1 = 9?

| 1 × 9 = 9 | 9 × 9 = 9 |

Finally, we make links to the abstract way that children learn to multiply large numbers, using chimney or column sums, in preparation for future work on long multiplication.

Which is true?

| 84
×3
250 | 84
×3
225 | 84
×3
152 | 84
×3
252 |

> **By playing Sumdog from Kindergarten, your students will have experienced 100s of practice questions in a range of formats and styles that build their conceptual understanding of multiplication, as well as their recall speed and accuracy.**

Please note that Premium features referenced in this framework are indicated with an asterisk (*).

Reasons to use the Sumdog Pathway to Multiplication Success

+ Your students will engage in a developed, structured pedagogy with the aim of **learning** multiplication facts, not memorizing.

+ Sumdog **complements** your everyday teaching, **supplements** your planning and existing schemes of work, and provides easy home learning links.

+ Our **progressive algorithm** introduces concepts to students in full alignment to state standards. We **build conceptual understanding and encourage metacognition** in learning.

+ Our **fun and engaging games**, challenges*, competitions* and contests provide students with many opportunities to apply their knowledge and **learn from their mistakes**.

+ Our platform encourages a **growth mindset**, rewarding students for their effort with coins that can be spent in the Sumdog house and garden.

+ Our **pre-made assessments** and reporting provide teachers with the tools they need to direct learning. You can also create your own custom assessments and easily and **subtly differentiate** to ensure everyone in your class experiences success.*

+ The free Sumdog multiplication practice tool and **Multiplication Tables Check** are perfectly designed to build your students' confidence for future assessments on a platform they know and love. The free **heat map report** provides you with insight into the tables to focus on and the MTC tool prepares your students for future multiplication assessments in a stress-free environment.
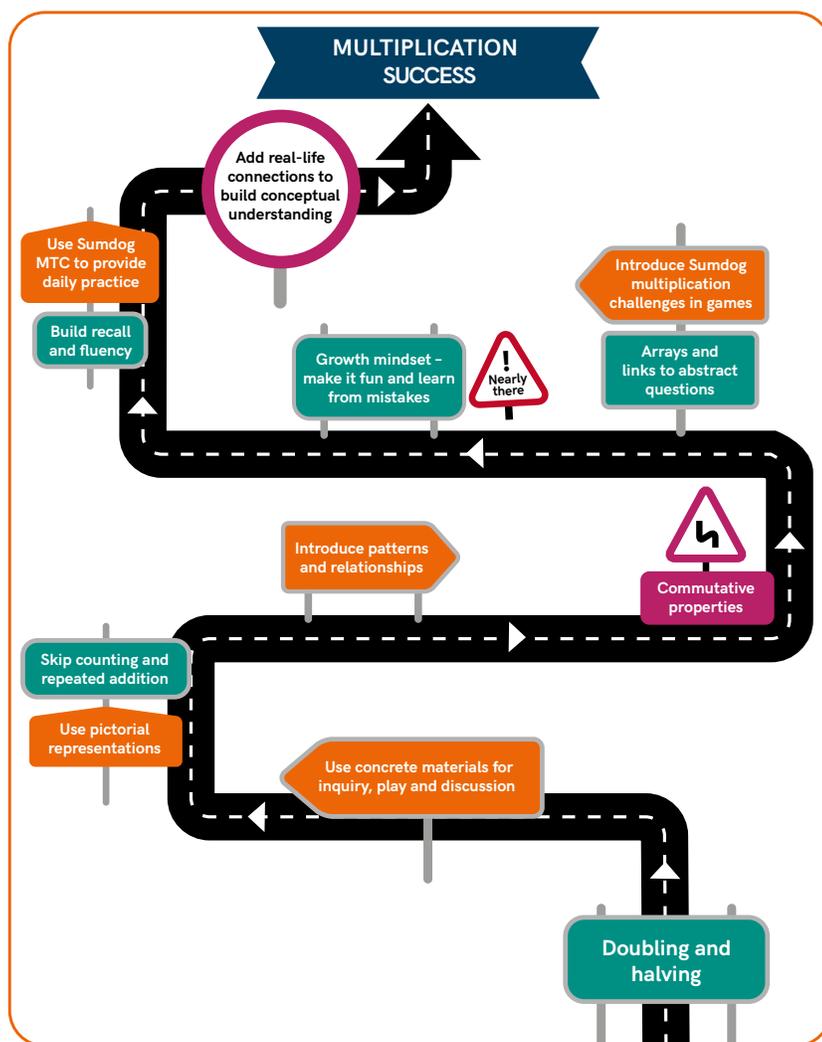
Please note that Premium features referenced in this framework are indicated with an asterisk (*).

Sumdog Free Account vs. Premium

The Sumdog pathway to multiplication success recommends the use of features which are included with a free Sumdog account, as well as additional features which can only be accessed with a premium account. Premium features have been identified in the pathway with an asterisk, but we have also included the following table for ease of reference.

Free Account Features	Premium Features
6 engaging games for children to choose from	Over 30 engaging games for children to choose from
Identify gaps with a diagnostic tool	Set challenges on standards-aligned topics that directly match in-class teaching
Support progression with adaptive questions tailored to each child's level	Pinpoint gaps in understanding with informal, online, low-stakes assessments
Set personalized practice for times tables and use our student chooser to easily and subtly differentiate	Create custom formative assessments or choose ready-made standards-aligned assessments to target intervention
Assess your students' multiplicative fluency with our Multiplication Table Check	Instant reporting to identify gaps in understanding
View heat map report of multiplication practice in games to easily identify gaps	Demonstrate impact with tracking reports for your whole school, grade levels, classes and individuals
Set-up support	Full support with set-up and regular communication from our Support team

"We know short bursts of just 10-15 minutes on Sumdog each day can have a big impact."
Neil Kelsall, National Lead Practitioner for Oasis Community Learning

Beyond Grade 4

Although the Sumdog Pathway to Multiplication Success does not continue past this point, it's important to remember that Sumdog can continue to build your students' mathematical fluency and conceptual understanding far beyond Grade 4!

Our adaptive practice, challenges and low-stakes assessments will continue to build students' knowledge progressively throughout **Grades 5–8** using our wide range of standards-aligned question content.

> You can continue to develop and improve your students' multiplicative fluency beyond Grade 4 by setting focus on multiplication and tracking improvement in attainment through the reporting, insights and heat maps that Sumdog provides.

Which is a factor of 30?

18	12	9	3

949 × 8 is about how much?

About 900 × 8	About 9 × 8	About 1,000 × 10	About 90 × 80

In Grades 5-8, we extend and challenge students' understanding of the number system, developing the connection of multiplication to division and encouraging students to apply the multiplication recall they have developed to fractions, decimals, algebra and more complex word problems.

Adam has 4 boxes of books with 25 books in each box. He wants to put the same number of books on each shelf of a bookshelf with 8 shelves, with the remainder going to his library. How many go on each shelf and how many go to the library?

4 × 29 ÷ 8	4 – 25 ÷ 8	29 × 25 ÷ 8	4 × 25 ÷ 8

Sample Lesson Plan: Introducing Arrays (Grade 2)

Aim:	Success Criteria:	Resources:
Understand that multiplication is **commutative** e.g., 4 × 3 = 3 × 4 I am learning to solve problems using arrays.	I can recognize patterns in an array.	Ten frame, dinosaurs/cubes/toys. Sumdog
	Key/New Words: Commutative, sets, groups, sharing, equally, between.	**Preparation:** Differentiated Sumdog challenges as required.* Selected Sumdog sample pictorial questions.

Prior Learning: Students will be familiar with counting to 20, backwards and forwards and will have started learning doubling and halving.

Learning Sequence

Starter	Students choose toys across the classroom and are asked to put them into a ten frame. Students create their own arrays and count how many they have. Using Sumdog sample questions, pictorial representations of arrays are shown. Students are asked to count columns and rows.
Main Activity	Key questions are posed as students develop their metacognition and understanding. Are 2 lots of 5 dinosaurs the same as 5 lots of 2 dinosaurs? You have 6 rows of 2 cubes, how many do you have altogether? 3 groups of 5
Supplemental	Sumdog custom assessment focusing on the arrays and the commutative property set to formatively assess understanding of content and inform next teaching.* Students are encouraged to plant an array of plants in the Sumdog garden as a home learning challenge.

Please note that Premium features referenced in this framework are indicated with an asterisk (*).

Sample Lesson Plan: Building Multiplication Fluency (Grade 3)

Aim:	Success Criteria	Resources:
To answer **multiplication facts** within 6 seconds in preparation for multiplication assessments. I can answer multiplication facts fluently.	I can answer multiplication questions within 6 seconds.	Sumdog Whiteboards
	Key/New Words: Multiplication, fluency, accuracy, efficiency, agility.	**Preparation:** Differentiated Sumdog multiplication focus as appropriate. Sumdog MTC practice.

Prior Learning: Students have a solid foundation of conceptual understanding of multiplication, including commutative, associative and distributive properties.

Learning Sequence

Starter	Students start with a quick-fire multiplication practice on Sumdog. The teacher will have differentiated this as appropriate.
Main Activity	Teacher places a Sumdog abstract multiplication on the screen using the Question Viewer and students quickly write their answer on whiteboards. Building on metacognition and mental agility, students discuss some of the commutative, associative and distributive properties of multiplication and the strategies they used to solve, including the patterns and relationships. Students then take part in a multiplication tables practice session on Sumdog. Solve x questions using the associative property $5 \times 6 \times 6 = $? $36 \times 6 = 216$ $5 \times 30 = 150$ $6 \times 25 = 150$ $5 \times 36 = 180$
Supplemental	Students finish with a game of Sumdog multiplication bingo, where students write down numbers 1–144. The teachers read out a multiplication sum and the students score out the product. The winner receives 50 Sumdog coins awarded by their teacher.

Please note that Premium features referenced in this framework are indicated with an asterisk (*).

Using the Sumdog MTC Heat Map

The Sumdog heat map will provide the average accuracy, speed and fluency of your students, weighted towards the most recent answers. Using our differentiated student chooser you can make sure that your students are focusing on the tables relevant to them.

- Teachers can use the **heat map to quickly identify** which tables their class need to practice more.
- Ability to change the **reporting metric** between **accuracy**, **speed** and **fluency.**
- Helps to **improve retention** by focusing student practice on tables questions.

> Remember, the Sumdog multiplication tools are completely free for all users.
>
> The Sumdog pathway to multiplication success is also free to download, print and use, but some elements referenced do require a Sumdog Premium account.

Contact us today to start your students on their pathway to multiplication success.

✈ julian.slatter@sumdog.com

➤ www.sumdog.com

Book a call today!