# **Multiplicative Thinking**

Interactive Resources:

## The multiplier: generate easy multiplications

Solve multiplications such as 9x88. Use a partitioning tool to help solve randomly generated multiplications. Learn strategies to do complex arithmetic in your head. Split a multiplication into parts that are easy to work with, use simple times tables, then solve the original calculation. This learning object is one in a series of five objects.

http://www.scootle.edu.au/ec/viewing/L83/index.html

# The multiplier: generate hard multiplications

Solve multiplications such as 67x88. Use a partitioning tool to help solve randomly generated multiplications. Learn strategies to do complex arithmetic in your head. Split a multiplication into parts that are easy to work with, use simple times tables, then solve the original calculation. This learning object is one in a series of five objects.

http://www.scootle.edu.au/ec/viewing/L84/index.html

## The multiplier: go figure

This tutorial is suitable for use with a screen reader. It explains strategies for solving complex multiplications in your head such as 22x38. Work through sample questions and instructions explaining how to use partitioning techniques. Solve multiplications by breaking them up into parts that are easy to work with, use simple times tables, then solve the original calculation. This learning object is one in a series of five learning objects.

http://www.scootle.edu.au/ec/viewing/L90/index.html

## **Rectangle division**

Use a rectangular grid to solve a division problem. Link division to multiplication. Investigate what happens as the dividend changes for a particular divisor. For example, find the answer when dividing 39 by 9. Dividends range from 2 to 99 and divisors from 2 to 19. Use the grid for investigating the meaning of factors too. The object is one in a series of three objects.

http://www.scootle.edu.au/ec/viewing/L3704/index.html

#### Videos:

## Building multiplication and division through equal grouping and counting

This is a teacher resource video about the stages through which students progress, over several years of primary schooling, as they develop an understanding of the processes of multiplication and division. The resource describes forming equal groups, perceptual multiples, figurative units, repeated addition of composite units and multiplication as an operation. The discussion is supported by video clips of students demonstrating their use of the skills relevant to each of these stages. The concluding part of the video extends the discussion to link multiplication and the calculation of area.

http://www.curriculumsupport.education.nsw.gov.au/countmein/learning\_framework\_in\_number\_\_\_\_\_\_3\_0.html

#### Building multiplication and division through multiplication and division as operations

This is a teacher resource video that describes students who are able to deal with multiplication as an operation without reference to counting strategies, and to recall multiplication facts. The discussion is supported by video clips of students demonstrating these skills and is extended to recognising the links between multiplication and division and between multiplication and calculation of area. This resource is the fifth and final teacher resource in a series on building an understanding of multiplication and division.

http://www.curriculumsupport.education.nsw.gov.au/countmein/learning\_framework\_in\_number\_ 3\_5.html

#### Lesson Guides:

#### **Multiplicative Thinking**

Multiplicative thinking is indicated by a capacity to work flexibly with the concepts, strategies and representations of multiplication (and division) as they occur in a wide range of contexts.

In this section, you can find details about:

Key characteristics of multiplicative thinking, example problems, multiplicative situations, from modelling to abstracting, transition during middle years and supporting the student.

http://www.education.vic.gov.au/school/teachers/teachingresources/discipline/maths/assessment/pages/multithink.aspx

## From Additive to Multiplicative Thinking- The Big Challenge of the Middle Years

https://fuse.education.vic.gov.au/pages/View.aspx?id=ce61539a-9e5e-478a-bd63-9b6cfb8c1ee9&Source=%252fpages%252fRss.aspx%253fs%253dThinking

## **Common Misunderstandings - Level 3 Multiplicative Thinking**

Although most students at this Level have some knowledge of the multiplication facts to 100 and can perform simple multiplication and division procedures correctly, many rely on rote learning and/or a naïve, groups of understanding for multiplication based on repeated addition (often counting equal groups by ones). With little or no access to a broader range of ideas for multiplication they find it difficult to develop efficient mental strategies, and as a consequence, tend to rely on memorised procedures for multiplying and dividing larger whole numbers and decimals.

http://www.education.vic.gov.au/school/teachers/teachingresources/discipline/maths/assessment/ pages/lvl3multi.aspx

## Multiplicative Thinking PowerPoint (Summary)

https://www.eduweb.vic.gov.au/edulibrary/public/teachlearn/student/ppmultithinking.pdf

## **MULTIPLICATIVE THINKING**

A Professional Development Seminar (PowerPoint)

http://www.aiz.vic.edu.au/Embed/Media/00000055/PD-Multiplication-and-Division.pdf.

## Learning to use multiplication and division to solve problems

http://www.nzmaths.co.nz/g-learning-use-multiplication-and-division-solve-problems

## TIMES Module 3: Number and Algebra: multiplication and division - teacher guide

This is a 23-page guide for teachers. This module contains a description of suitable models for multiplication, a discussion of the type of problem phrased in words that requires multiplication for its solution, and mental and written strategies for multiplication. The use of the commutative, associative and distributive laws is described in the module. A history of the development of multiplication concludes the module.

http://www.amsi.org.au/teacher\_modules/multiplication\_and\_division.html

#### **Exploring division and multiplication**

This collection of 17 digital curriculum resources contains activities to consolidate and extend students' problem-solving skills in the areas of multiplication and division. The first category, arrays, allows students to visualise problems while consolidating the idea that multiplication involves repeated groups of objects. The second category, solving multiplication and division problems, enables students to solve and create problems and helps them to develop their own strategies for solving equations. Assessment tools are included.

http://www.scootle.edu.au/ec/viewing/R11083/index.html

#### TIMES Module 10: number and algebra: division of whole numbers - teacher guide

This is a 26-page guide for teachers. This module contains a description of suitable models for division, a discussion of the types of problems that require division for their solution, and mental and written strategies for division.

http://www.amsi.org.au/teacher modules/division of whole numbers.html