



English as an Additional Language or Dialect Teacher Resource

Annotated Content Descriptions | Mathematics

Pre-primary to Year 10

IMPORTANT INFORMATION

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Introduction

This publication contains annotations that describe linguistic and cultural considerations implied by some Mathematics content descriptions. It also suggests teaching strategies to better enable EAL/D students to access the learning described in the Mathematics content descriptions.

The annotated content descriptions for each of English, Mathematics, Science and History have been developed to advise teachers about areas of the curriculum that EAL/D students may find challenging and why, help teachers understand students' cultural and linguistic diversity and the ways this understanding can be used in the classroom and provide examples of teaching strategies supportive of EAL/D students.

The resource has been developed to:

- advise teachers about areas of the curriculum that EAL/D students may find challenging and why
- assist classroom teachers to identify where their EAL/D students are broadly positioned on a progression of English language learning
- help teachers understand students' cultural and linguistic diversity, and the ways this understanding can be used in the classroom
- provide examples of teaching strategies supportive of EAL/D students
- direct teachers to additional relevant and useful support for teaching EAL/D students.

Throughout the resource, English refers to Standard Australian English.

Annotated Content Descriptions | Mathematics

Pre-primary

CONTENT DESCRIPTIONS	LANGUAGE/CULTURAL CONSIDERATIONS	TEACHING STRATEGIES
<p>Measurement and geometry</p> <p>Use direct and indirect comparisons to decide which is longer, heavier and holds more, and explain reasoning in everyday language (ACMMG006)</p>	<p>The language of comparison in English includes the use of the comparative adjective forms. These include: adding ‘-er’ to one- or two-syllable adjectives (for example, ‘This tower is taller’), using ‘more’ for adjectives with three or more syllables (for example, ‘This tower is more gigantic’), and the irregular comparative adjectives such as ‘better’, not ‘gooder’. For most native English speakers, this is intuitive knowledge that comes from a sense of what sounds right.</p>	<p>Teach EAL/D students different forms of comparative adjectives and how to construct sentences to describe comparisons.</p> <p>Provide sentence models that students can modify by adding their own content.</p>
<p>Measurement and geometry</p> <p>Compare and order the duration of events using the everyday language of time (ACMMG007)</p>	<p>EAL/D students often don’t know the English vocabulary for everyday home and family items because they use their mother tongue in these contexts, and have not had the exposure to English vocabulary that we might expect of the other students in the class.</p>	<p>Build visual word banks for everyday vocabulary.</p> <p>Use concrete objects; for example, items around the classroom can be labelled using students’ first languages.</p>
<p>Measurement and geometry</p> <p>Connect days of the week to familiar events and actions (ACMMG008)</p>	<p>Not everyone has the same ‘everyday’ routines. EAL/D students, in particular, may have routines at home that differ from the taken-for-granted routines of the classroom.</p>	<p>When modelling examples of the task (for example, sequencing events in the day of a child), use a variety of possibilities for the events and the times they may occur.</p>
<p>Measurement and geometry</p> <p>Sort, describe and name familiar two-dimensional shapes and three-dimensional objects in the environment (ACMMG009)</p>	<p>Words themselves often contain the concept being taught, and so the language and the content are often effectively taught in conjunction with one another (for example, tri-angle).</p>	<p>Build picture dictionaries of mathematical terms that illustrate the meaningful parts (morphemes) of the words.</p>
<p>Measurement and geometry</p> <p>Describe position and movement (ACMMG010)</p>	<p>Not all vocabulary challenges involve the technical or long words. Some of the more challenging words in English for all EAL/D students are the small words (for example, the articles ‘the’, ‘an’, ‘a’, and the prepositions ‘on’, ‘under’, ‘over’).</p>	<p>Pay attention to the ways that small words such as prepositions are used in describing position and movement, and use pictures, role play and gesture to illustrate their meaning to EAL/D students in the Beginning and Emerging phases of English language learning.</p>

CONTENT DESCRIPTIONS	LANGUAGE/CULTURAL CONSIDERATIONS	TEACHING STRATEGIES
<p>Measurement and geometry Describe position and movement (ACMMG010)</p>	<p>Not all vocabulary challenges involve the technical or long words. Some of the more challenging words in English for all EAL/D students are the small words (for example, the articles ‘the’, ‘an’, ‘a’, and the prepositions ‘on’, ‘under’, ‘over’).</p>	<p>Pay attention to the ways that small words such as prepositions are used in describing position and movement, and use pictures, role play and gesture to illustrate their meaning to EAL/D students in the Beginning and Emerging phases of English language learning.</p>
<p>Number and algebra Connect number names, numerals and quantities, initially up to 10 and then beyond (ACMNA002)</p>	<p>The patterns of English number words are different from other languages, and this may impact on EAL/D students’ understandings of both the number concept and the word in English (for example, in Greek 13 = ten three, 14 = ten four).</p>	<p>Teach the patterns of number words, combining numeral, and real and pictorial representation with spoken and written words.</p>
<p>Number and algebra Compare, order and make correspondences between collections, initially to 20, and explain reasoning (ACMNA289)</p>	<p>Words have different meanings in different contexts, and this can be especially challenging for EAL/D students (for example, ‘second’ in Mathematics can refer to the ordinal number or a unit of time).</p>	<p>Monitor EAL/D students’ understandings of vocabulary in Mathematics. Provide explicit explanations and demonstrations of differences in the meanings of words in mathematical contexts.</p>
<p>Number and algebra Sort and classify familiar objects and explain the basis for these classifications Copy, continue and create patterns with objects and drawings (ACMNA005)</p>	<p>EAL/D students in the Beginning and Emerging phases of English language learning may not have had the experiences with objects that teachers may consider ‘familiar’.</p>	<p>Ensure that EAL/D students have an understanding of the objects they are sorting; pre-teaching vocabulary and providing a variety of objects to sort and classify that are reflective of EAL/D students’ experiences.</p>
<p>Statistics and probability Answer ‘yes/no’ questions to collect information (ACMSP011)</p>	<p>English questions are formed in many ways and can be challenging for many EAL/D students. For example, questions can be formed by changing word order – ‘Are you six years old?’, or by using question words – ‘How old are you?’ ‘Do you have a brother?’ Many Aboriginal and Torres Strait Islander cultures use questioning in social context only, and not for learning.</p>	<p>Monitor the language of EAL/D students when they pose questions, and explicitly teach English question forms by providing models of the structure of questions required for the chosen activity.</p>

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Year 1

CONTENT DESCRIPTIONS	LANGUAGE/CULTURAL CONSIDERATIONS	TEACHING STRATEGIES
<p>Measurement and geometry Measure and compare the lengths and capacities of pairs of objects using uniform informal units (ACMMG019)</p>	<p>The language of comparison in English includes the use of the comparative adjective forms. These include: adding ‘-er’ to one- or two-syllable adjectives (for example, ‘This tower is taller’), using ‘more’ for adjectives with three or more syllables (for example, ‘This tower is more gigantic’), and the irregular comparative adjectives such as ‘better’, not ‘gooder’. For most native English speakers, this is intuitive knowledge that comes from a sense of what sounds right.</p>	<p>Teach these comparative forms to EAL/D students, providing sentence patterns for them to use, and oral repetition.</p>
<p>Measurement and geometry Tell time to the half hour (ACMMG020)</p>	<p>The telling of time is constructed differently in different languages, and often reflects concepts of time in different cultures. For example, in some languages ‘half past four’ is constructed as ‘half to five’. Time in many Aboriginal and Torres Strait Islander cultures is ‘measured’ in terms of quality of event rather than duration.</p>	<p>Teach the language structures of telling the time, being aware of possible linguistic differences, to better understand if problems with time-telling are linguistic or conceptual.</p>
<p>Measurement and geometry Describe duration using months, weeks, days and hours (ACMMG021)</p>	<p>Familiar vocabulary is often used in abstract ways in Mathematics that is challenging for EAL/D students. For example, in questions such as ‘How long is it until the end of the week?’ – ‘long’ is an abstract measurement of time, rather than the more concrete ‘I have long hair.’</p> <p>Words themselves often contain the concept being taught, and so the language and the content are often effectively taught in conjunction with one another (for example, the days of the week: Mon–day, Tues–day).</p>	<p>Note the ways that vocabulary is being used in Maths tasks and teacher questioning, and monitor possible misunderstandings in EAL/D students.</p> <p>Put the question to EAL/D students in the Beginning and Emerging phases of English language learning in more than one way. For example, ‘Today is Monday. How many days until Friday?’ supported by visuals such as a calendar.</p> <p>Build class glossaries that highlight the meaningful (morphemic) patterns in words (for example, highlighting similar morphemic patterns in the same colour).</p>

CONTENT DESCRIPTIONS	LANGUAGE/CULTURAL CONSIDERATIONS	TEACHING STRATEGIES
<p>Measurement and geometry Recognise, visualise and classify familiar two-dimensional shapes and three-dimensional objects using obvious features (ACMMG022)</p>	<p>Words have specialist meanings in mathematical contexts, and this can be especially challenging for EAL/D students (for example, in Mathematics ‘face’ refers to a geometrical feature, but in everyday language it refers to a part of the body).</p>	<p>Monitor the vocabulary in Mathematics tasks for potential misunderstandings, and make differences in meaning clear to EAL/D students.</p>
<p>Measurement and geometry Give and follow directions to familiar locations (ACMMG023)</p>	<p>Most morphemes allow us to change the meaning of a word (for example, anti-clockwise), or to change its word class (for example, clock-wise, which changes a noun to an adjective).</p>	<p>Teach this morphological knowledge to EAL/D students to support them to efficiently expand their vocabulary and increase comprehension.</p>
<p>Number and algebra Represent and solve simple addition and subtraction problems using a range of strategies including counting on, partitioning and rearranging parts (ACMNA015)</p>	<p>Familiar vocabulary is often used in abstract ways in Mathematics, and this can be especially challenging for EAL/D students. For example, in questions such as ‘How many are left?’, ‘left’ asks the learner about a remainder, whereas in ‘Turn left’, ‘left’ gives a direction.</p>	<p>Monitor the language of Mathematics tasks for potential misunderstandings and explicitly teach the meanings of words in different contexts.</p>
<p>Number and algebra Recognise, describe and order Australian coins according to their value (ACMNA017)</p>	<p>All EAL/D students have rich cultural resources that give them alternative perspectives on issues and phenomena, as well as experiences and knowledge.</p>	<p>Make use of these resources when exploring the world around them. For example, many EAL/D students will have concrete experiences, and even samples, of other coins and money systems.</p>
<p>Statistics and probability Identify outcomes of familiar events involving chance and describe them using everyday language such as ‘will happen’, ‘won’t happen’ or ‘might happen’ (ACMSP024)</p>	<p>The modal verbs in English (for example, ‘will’, ‘may’, ‘might’, ‘should’, ‘could’) modify the certainty of verbs and are a feature of hypothesising. They are a feature mastered late in the language progression of EAL/D students and are not necessarily ‘everyday’ language. Words of chance do not necessarily exist in many traditional Aboriginal and Torres Strait Islander languages, and so these concepts may need to be explicitly taught, as well as the vocabulary.</p>	<p>Support EAL/D students to understand how modality can create nuance or indicate degrees of possibility. Provide and discuss models of sentences with different degrees of modality (for example, ‘it might rain’, ‘it could rain’, ‘it will rain’).</p>

CONTENT DESCRIPTIONS	LANGUAGE/CULTURAL CONSIDERATIONS	TEACHING STRATEGIES
<p>Statistics and probability Choose simple questions and gather responses (ACMSP262)</p>	<p>In English, questions are formed in many ways and are quite challenging for EAL/D students. They can be formed by changing word order (for example, 'Are you from Australia?'), or by using question words (for example, 'Do you come from Australia?' 'How many brothers do you have?'), as well as the 'wh' question words – why, what, who, where.</p>	<p>Monitor the language of EAL/D students when they pose questions, and explicitly teach English question forms. Provide model question formats for students to use as they construct their own.</p>

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Year 2

CONTENT DESCRIPTIONS	LANGUAGE/CULTURAL CONSIDERATIONS	TEACHING STRATEGIES
<p>Measurement and geometry Compare and order several shapes and objects based on length, area, volume and capacity using appropriate uniform informal units (ACMMG037)</p>	<p>Abbreviations are used often in non-narrative texts, and may be considered to be known language (for example, in Mathematics: 3D = three-dimensional, kg, cm).</p>	<p>Teach the source words of the abbreviations to support the students' understanding of the concept that the abbreviation is representing.</p> <p>Provide readily accessible charts of abbreviations.</p>
<p>Measurement and geometry Compare masses of objects using balance scales (ACMMG038)</p>	<p>Many Aboriginal and Torres Strait Islander languages don't have words of comparison (for example, 'big mobs', 'big big mobs').</p> <p>The language of comparison in English includes the use of the comparative and superlative adjective forms. ', in Mathematics, lighter, the lightest, adding '-er' and using the article 'the' and adding the suffix '-est' to one- or two-syllable adjectives. This is not intuitive knowledge for EAL/D students.</p>	<p>Model the language structures of comparison, pointing out the suffix on the end of the word, and the use of the article 'the' when making the superlative.</p> <p>Provide wall charts of comparative and superlative forms of adjectives.</p>
<p>Measurement and geometry Tell time to the quarter hour, using the language of 'past' and 'to' (ACMMG039)</p>	<p>The telling of time is constructed differently in different languages, and this often reflects concepts of time in different cultures. For example, in Greek 'quarter to five' is constructed as 'six less a quarter'.</p>	<p>Teach the language structures of telling the time, being aware of possible linguistic differences to better understand if problems with time-telling are linguistic or conceptual.</p>
<p>Measurement and geometry Name and order months and seasons (ACMMG040)</p>	<p>Seasons are understood differently according to geographical locations, including the wet and dry seasons in the tropics, to the more complex seasonal descriptors used by some Aboriginal and Torres Strait Islander people.</p>	<p>Relate work on seasons to the teaching and learning environment, using descriptors relevant to the geographical location.</p> <p>Use bilingual assistants, where available, or parents as useful sources of information about the local environment.</p>
<p>Measurement and geometry Use a calendar to identify the date and determine the number of days in each month (ACMMG041)</p>	<p>EAL/D students have rich cultural resources that give them alternative perspectives on issues and phenomena, as well as experiences and knowledge.</p>	<p>Find out where EAL/D students in the classroom have come from and their experiences, and make active use of these resources by asking questions and inviting their expertise. For example, the Gregorian calendar used in the West is not the only</p>

CONTENT DESCRIPTIONS	LANGUAGE/CULTURAL CONSIDERATIONS	TEACHING STRATEGIES
		calendar, and EAL/D students may have different expectations and experiences of other lunar calendars, including the Chinese and Islamic calendars.
<p>Measurement and geometry Describe and draw two-dimensional shapes, with and without digital technologies (ACMMG042)</p>	English words often contain their meanings, through their morphemes (for example, in Mathematics, tri–angle, tri = three).	Teach the morphemes within mathematical terms to help develop comprehension and expand vocabulary in EAL/D students Mathematics.
<p>Measurement and geometry Describe the features of three-dimensional objects (ACMMG043)</p>	Mathematics contains subject-specific vocabulary that would not have been encountered by EAL/D students in any other context (for example, words such as ‘tally’, ‘prism’, ‘rhombus’).	Teach subject-specific vocabulary explicitly and in context using objects. Use illustrated glossaries and word walls so that vocabulary can be revisited throughout the school day.
<p>Measurement and geometry Interpret simple maps of familiar locations and identify the relative positions of key features (ACMMG044)</p>	Diagrams, including maps, in Mathematics are informational, and are different from the images that students usually create intuitively. For example, maps must be to scale and usually represent a bird’s eye view.	Provide models of maps and unpack their features in the same way as modelled written texts are provided to students.
<p>Measurement and geometry Investigate the effect of 1-step slides and flips with and without digital technologies (ACMMG045)</p>	Hypothesising in English requires conditional language structures that will be challenging for EAL/D students, as they require the use of multiple verb structures and tenses (for example, ‘I think if I turn the shape one more time it will make a diamond’).	Provide clear models of conditional sentence structures for EAL/D students to follow (for example, ‘I think ..., will ..., if ...’).
<p>Number and algebra Investigate number sequences, initially those increasing and decreasing by twos, threes, fives and tens from any starting point, then moving to other sequences (ACMNA026)</p>	Every language produces its own sounds. Some of the sounds of English will be new for EAL/D students in the Beginning phase of English language learning and may be difficult to distinguish and reproduce.	Teach the sounds of English, paying particular attention to their matching ‘graphemes’ (written representation). For example, the difference between the final sounds of fif– ty and fif– teen .
<p>Number and algebra Recognise, model, represent and order numbers to at least 1000 (ACMNA027)</p>	Words themselves often contain the concept being taught. For example, the number words reflect the number concepts they represent –six, six– teen , six– ty (a morpheme marking the multiples of ten), six– th (a morpheme marking ordinal number).	Teach the language of number and the concept of number concurrently – highlighting both the word ending and its numerical meaning.

CONTENT DESCRIPTIONS	LANGUAGE/CULTURAL CONSIDERATIONS	TEACHING STRATEGIES
<p>Number and algebra Group, partition and rearrange collections up to 1000 in hundreds, tens and ones to facilitate more efficient counting (ACMNA028)</p>	<p>All students have rich experiences and knowledge that are valuable resources to draw on to add to the learning and experiences of all students in the classroom.</p>	<p>Make use of these resources when exploring the world around them. For example, some EAL/D students from Asian countries will have first-hand expertise in the use of the abacus, which is an everyday calculation tool.</p>
<p>Number and algebra Solve simple addition and subtraction problems using a range of efficient mental and written strategies (ACMNA030)</p>	<p>Many EAL/D students will have the conceptual skills, and first language experience, to solve numerical problems, but will struggle with the language required to interpret written Mathematics problems or construct word stories to accompany numerical equations. Teachers should be mindful of whether it is language that is preventing EAL/D students from demonstrating mathematical achievement.</p>	<p>Present addition and subtraction problems in multiple ways, and allow EAL/D students to show possible alternative methods for solving number problems. Break the problem up and highlight the key words that signal mathematical actions. Parents and bilingual assistants, where available, can be useful sources of information.</p>
<p>Number and algebra Recognise and represent multiplication as repeated addition, groups and arrays (ACMNA031)</p>	<p>Reasoning and explaining require the language of cause and effect in English, involving the use of connectives and conjunctions, which appear later in the language progression of EAL/D students. For example, ‘First I had 10 blocks, then I put ten more blocks because I was going up in lots of 10.’</p>	<p>Teach the sentence structures and connectors required of the task. Build word banks of connectors in context, and their function in the sentence (for example, to give more information, to say what happens next).</p>
<p>Number and algebra Recognise and represent division as grouping into equal sets and solve simple problems using these representations (ACMNA032)</p>	<p>Shared and direct experiences are an effective way of ensuring that all students start with the same Pre-primary content knowledge.</p>	<p>Ensure that EAL/D students are active participants in direct experiences (for example, physically dividing a group of objects into equal sets). While doing the activity, EAL/D students in the Beginning and Emerging phases of English language learning can ‘voice’ vocabulary and sentence structure being modelled by their teacher. For example, ‘Here are two groups of three. That makes six altogether.’</p>
<p>Number and algebra Recognise and interpret common uses of halves, quarters and eighths of shapes and collections (ACMNA033)</p>	<p>Some mathematical vocabulary carries different meanings in different contexts (for example, ‘eighth’ can be a fraction or an ordinal number). This can be confusing to EAL/D students in the Beginning and Emerging phases of English language learning.</p>	<p>Teach vocabulary in mathematical tasks, including words and terminology being used in ways that EAL/D students may not have encountered before.</p>

CONTENT DESCRIPTIONS	LANGUAGE/CULTURAL CONSIDERATIONS	TEACHING STRATEGIES
<p>Number and algebra Count and order small collections of Australian coins and notes according to their value (ACMNA034)</p>	<p>All students have cultural experiences and knowledge that are valuable resources for the classroom.</p>	<p>Make use of these resources and experiences in the classroom when exploring money. For example, many EAL/D students will have concrete experience, and samples, of other coins and money systems.</p>
<p>Number and algebra Solve problems by writing number sentences for addition or subtraction (ACMNA036)</p>	<p>Word problems in Mathematics often introduce sentence structures that are new learning and challenging for EAL/D students. For example, the use of ellipsis, where the object is referred to once and then implied – ‘There are 12 pieces of pizza. When you take away 4 [pieces of pizza] how many [pieces of pizza] are left?’</p>	<p>Provide scaffolds into Mathematics word problems by using alternative wording. Teach the ellipsis in word problems, asking the students: ‘When it says to take away 4, what does it mean – take away 4 what?’</p>
<p>Statistics and probability Identify practical activities and everyday events that involve chance. Describe outcomes as ‘likely’ or ‘unlikely’ and identify some events as ‘certain’ or ‘impossible’ (ACMSP047)</p>	<p>Size of vocabulary is one of the best predictors of literacy success, and EAL/D students will not have had six or seven years of exposure to English vocabulary as we might expect of other students in the classroom, nor the same ‘prior knowledge’ to build upon, and so special attention must be paid to vocabulary development in the classroom.</p>	<p>Explore the vocabulary of ‘certainty’ by placing terms on a continuum from least certain to most certain. Build synonym word banks for mathematical terminology. Teach the prefixes and suffixes and their meaning (for example, ‘unlikely’, ‘impossible’) so that EAL/D students can build their vocabulary.</p>

Annotated Content Descriptions | Mathematics

Year 3

CONTENT DESCRIPTIONS	LANGUAGE/CULTURAL CONSIDERATIONS	TEACHING STRATEGIES
<p>Measurement and geometry Measure, order and compare objects using familiar metric units of length, mass and capacity (ACMMG061)</p>	<p>Abbreviations are used often in non-narrative texts, and may be considered to be known language, but EAL/D students have not had the years of exposure to English that teachers might expect of the other class members. For example, in Mathematics: kg, cm.</p>	<p>Teach the source words of the abbreviations to support the students' understanding of the concept that the abbreviation is representing.</p> <p>Provide readily accessible charts of abbreviations.</p>
<p>Measurement and geometry Tell time to the minute and investigate the relationship between units of time (ACMMG062)</p>	<p>The telling of time is constructed differently in different languages, and this often reflects concepts of time in different cultures. For example, in Greek 'quarter to five' is constructed as 'six less a quarter'.</p>	<p>Teach the language structures of telling the time, being aware of possible linguistic differences to better understand if problems with time-telling are linguistic or conceptual.</p>
<p>Measurement and geometry Make models of three-dimensional objects and describe key features (ACMMG063)</p>	<p>Vocabulary in Mathematics is often used in specialist ways that are different from everyday usage (for example, 'face' – 'How many faces does a cube have?').</p>	<p>Identify vocabulary being used in specialist ways and explicitly teach the difference between the different usages. Labelled visuals can be used (for example, we know two ways to use 'face': 'This is my face' – label a photograph, and 'This is the face of a cube' – label a photograph).</p>
<p>Measurement and geometry Create and interpret simple grid maps to show position and pathways (ACMMG065)</p>	<p>Diagrams, including maps, in Mathematics are informational, and are different from the images that students usually create intuitively. For example, maps must be to scale and usually represent a bird's eye view.</p>	<p>Provide models of maps and unpack their features in the same way as modelled written texts are provided to students.</p>
<p>Number and algebra Recognise, model, represent and order numbers to at least 10 000 (ACMNA052)</p>	<p>Words themselves often contain the concept being taught. For example, the number words reflect the number concepts they represent – six, six-teen, six-ty (a morpheme marking the multiples of ten), six-th (a morpheme marking ordinal number).</p>	<p>Teach the language of number and the concept of number concurrently, highlighting both the word ending and its numerical meaning, supported by pictorial representations of the number.</p>
<p>Number and algebra Apply place value to partition, rearrange and regroup numbers to at least 10 000 to assist calculation and solve problems (ACMNA053)</p>	<p>The symbols of Mathematics are not universal. For example, a comma is used to indicate place value for 'thousands' – 1,000 in French, and a full stop in Greek.</p>	<p>Be aware of the mathematical knowledge that the EAL/D student has and the Mathematics conventions in their first language, as this may explain errors in work.</p>

CONTENT DESCRIPTIONS	LANGUAGE/CULTURAL CONSIDERATIONS	TEACHING STRATEGIES
		Parents and bilingual assistants, where available, can be useful resources.
<p>Number and algebra Recall multiplication facts of 2, 3, 5 and 10, and related division facts (ACMNA056)</p>	Familiar vocabulary is often used in metaphorical ways in Mathematics, and this can be especially challenging for EAL/D students (for example, ‘How many times does two go into six?’).	Represent multiplication and division facts pictorially, carry out operations physically using objects and teach the different ways that these operations are expressed. For example, ‘How many times does two go into six?’ ‘What is six divided by two?’
<p>Number and algebra Represent and solve problems involving multiplication using efficient mental and written strategies and appropriate digital technologies (ACMNA057)</p>	Word problems in Mathematics often introduce sentence structures that are new learning and challenging for EAL/D students. For example, the use of ellipsis, where the object is referred to once and then implied – ‘There are 12 pieces of pizza. When you take away 4 [pieces of pizza] how many [pieces of pizza] are left?’	Provide scaffolds into Mathematics word problems by using alternative wording. Teach the ellipsis in word problems, asking the students: ‘When it says to take away 4, what does it mean – take away 4 what?’
<p>Number and algebra Model and represent unit fractions including $\frac{1}{2}$, $\frac{1}{4}$, $\frac{1}{3}$, $\frac{1}{5}$ and their multiples to a complete whole (ACMNA058)</p>	The texts used in the learning areas often introduce sentence structures that are new learning and challenging for EAL/D students. In Mathematics, an imperative sentence is sometimes used, and these sentences often start with specialist verbs (for example, ‘ Shade one half, $\frac{1}{2}$, of the circle’).	Provide visual supports and models of the instructional sentences used in Mathematics. Use illustrated glossaries for specialist language.
<p>Number and algebra Represent money values in multiple ways and count out the change of simple transactions to the nearest 5 cents (ACMNA059)</p>	All students have rich experiences and knowledge that are valuable resources to be drawn upon to add to the learning and experiences of all students in the classroom.	Make use of these resources when exploring the world around them. For example, many EAL/D students will have concrete experience, and samples, of other coins and money systems.
<p>Statistics and probability Conduct chance experiments, identify and describe possible outcomes and recognise variations in results (ACMSP067)</p>	Hypothesising in English requires conditional language structures, which will be difficult for EAL/D students, as they require the use of multiple verb structures and tenses (for example, ‘If I throw the dice one more time, I think it will be a six’).	Provide clear models of conditional sentence structures for EAL/D students to follow (for example, ‘I think ..., will ..., if ...’).
<p>Statistics and probability Identify questions or issues for categorical variables. Identify data sources and plan methods of data collection and recording (ACMSP068)</p>	In English, questions are formed in many ways and are quite challenging for EAL/D students. They can be formed by changing word order (for example, ‘Are you from Australia?’), or by using question words (for	Monitor the language of EAL/D students when they pose questions, and explicitly teach English question forms.

CONTENT DESCRIPTIONS	LANGUAGE/CULTURAL CONSIDERATIONS	TEACHING STRATEGIES
	example, 'Do you have a brother or sister?' 'How many brothers do you have?'), as well as the 'wh' question words – why, what, who, where.	
<p>Statistics and probability</p> <p>Collect data and organise into categories and create displays using lists, tables, picture graphs and simple column graphs, with and without the use of digital technologies (ACMSP069)</p>	<p>Diagrams in Mathematics are informational, and are different from the images that students usually create intuitively. For example, tables and graphs require accuracy in size relationships and precision in line work.</p>	<p>Provide models of mathematical diagrams and tables in the same way as modelled written texts are provided to students. Discuss the features of the required visual texts.</p>
<p>Statistics and probability</p> <p>Interpret and compare data displays (ACMSP070)</p>	<p>It is important to teach subject-specific vocabulary explicitly and in context. In Mathematics, for example, words such as 'tally' and 'data' would not have been encountered by EAL/D students in any other context.</p>	<p>Support all students to understand the vocabulary of tasks. Strategies include:</p> <ul style="list-style-type: none"> • providing word lists and visuals to accompany new learning • building synonym lists • constructing personal word books.

Annotated Content Descriptions | Mathematics

Year 4

CONTENT DESCRIPTIONS	LANGUAGE/CULTURAL CONSIDERATIONS	TEACHING STRATEGIES
<p>Measurement and geometry Use scaled instruments to measure and compare lengths, masses, capacities and temperatures (ACMMG084)</p>	<p>Abbreviations are used often in non-narrative texts, and may be considered to be known language, but EAL/D students have not had the years of exposure to English that teachers might expect of the other class members. For example, in Mathematics: kg, cm.</p>	<p>Teach the source words of the abbreviations to support the students' understanding of the concept that the abbreviation is representing. Provide readily accessible charts of abbreviations.</p>
<p>Measurement and geometry Compare objects using familiar metric units of area and volume (ACMMG290)</p>	<p>Metric units use common morphemes to make new words (for example, 'cent', 'kilo'). These morphemes play an important role in helping to comprehend words and spell them. Morphological knowledge is crucial for EAL/D students, as it allows them to efficiently expand their vocabulary, through building word families. Nouns in English can be characterised as 'countable' or 'uncountable'. Countable nouns can be described with numbers (for example, 10 marbles), and we ask questions about them using 'many'. For example, 'How many marbles do you think are in the jar?' Uncountable nouns can't be described with numbers, and we ask questions about uncountable nouns using 'much'. For example, 'How much water do you think is in the jar?' This distinction comes intuitively to native speakers of English, but not to EAL/D students who have less experience with the language to hear what 'sounds right'.</p>	<p>Unpack the meaning of words (for example, centi = 100, metre = to count; kilo = 1000, kilometre, kilogram, kilowatt). Build glossaries of word families. Make explicit which items are 'countable' or 'uncountable', and model the appropriate use of 'much' or 'many' accordingly.</p>
<p>Measurement and geometry Use am and pm notation and solve simple time problems (ACMMG086)</p>	<p>Abbreviations are used often in Mathematics texts, and may be considered to be known language, but EAL/D students have not had the years of exposure to English that teachers might expect of the other class members; for example, am/pm.</p>	<p>Teach the source words of the abbreviations to support the students' understanding of the concept that the abbreviation is representing. Have readily accessible charts of abbreviations.</p>

CONTENT DESCRIPTIONS	LANGUAGE/CULTURAL CONSIDERATIONS	TEACHING STRATEGIES
<p>Measurement and geometry</p> <p>Compare and describe two-dimensional shapes that result from combining and splitting common shapes, with and without the use of digital technologies (ACMMG088)</p>	<p>The language of comparison in English includes the use of the comparative adjective forms. These include: adding ‘-er’ to one- or two-syllable adjectives – ‘This square is smaller’, using ‘more’ for adjectives with more than two syllables – ‘The circle is more difficult to split’, and adding ‘the’ and ‘-est’ to form the superlative – ‘This rectangle is the biggest.’</p>	<p>Explain different forms of comparative adjectives in the context of student learning. Build lists of comparative and superlative forms, with the words in context, in personal word books.</p> <p>When encountering misused comparatives in EAL/D writing and speech explain the error rather than simply correct it.</p>
<p>Measurement and geometry</p> <p>Compare angles and classify them as equal to, greater than or less than a right angle (ACMMG089)</p>	<p>Generally, Mathematics requires the use of precise language. For example, in Mathematics, half refers to a precise amount – that is $\frac{1}{2}$. However, in everyday language it can have a more colloquial, and imprecise meaning (for example, ‘Half the class is away today’).</p>	<p>Ensure that students understand the difference between the precision of language required in mathematical contexts and more imprecise meanings in everyday language.</p>
<p>Measurement and geometry</p> <p>Use simple scales, legends and directions to interpret information contained in basic maps (ACMMG090)</p>	<p>EAL/D students bring rich experiences with them to the classroom, which can be acknowledged and used in the everyday work of the classroom to build self-esteem and belonging.</p>	<p>Focus on the countries of origin of students in the class to look at maps and mapping.</p>
<p>Number and algebra</p> <p>Recognise, represent and order numbers to at least tens of thousands (ACMNA072)</p>	<p>Even EAL/D students in the Consolidating phase of English language learning may revert to doing number work in the first language. Students in the Beginning and Emerging phases of English language learning may have the number concepts, but may struggle with the number words.</p>	<p>Unpack the way that numbers are represented with words.</p> <p>Allow students to work with concrete materials.</p>
<p>Number and algebra</p> <p>Investigate number sequences involving multiples of 3, 4, 6, 7, 8, and 9 (ACMNA074)</p>	<p>EAL/D students in the Beginning and Emerging phases of English language learning will have a limited range of synonyms for mathematical functions.</p>	<p>Be aware of the range of language used to explain concepts (for example, multiplication can be described by: ‘times’, ‘by’, ‘lots of’, ‘groups of’, ‘multiplied by’).</p> <p>Provide consistency for EAL/D students by gradually developing a glossary of terms.</p>
<p>Number and algebra</p> <p>Investigate equivalent fractions used in contexts (ACMNA077)</p>	<p>Vocabulary in mathematics can be challenging for EAL/D students, when the same words perform different mathematical functions (for example, third = ordinal, third = fraction).</p>	<p>Ensure that EAL/D students understand the ways in which terminology is being used.</p>

CONTENT DESCRIPTIONS	LANGUAGE/CULTURAL CONSIDERATIONS	TEACHING STRATEGIES
<p>Number and algebra</p> <p>Solve problems involving purchase and the calculation of change to the nearest 5 cents, with and without digital technologies (ACMNA080)</p>	<p>All EAL/D students bring cultural knowledge and experience to the classroom, which should be used in everyday teaching to build self-esteem and belonging. Word problems in mathematics often introduce sentence structures that are new learning and challenging for EAL/D students.</p>	<p>Look at the money notes and coins of the countries of origin of students in the classroom. Provide scaffolds into mathematics word problems for students in the Beginning and Emerging phases of English language learning by using alternative wording and visual supports.</p>
<p>Number and algebra</p> <p>Solve word problems by writing number sentences involving multiplication or division without remainder (ACMNA082)</p>	<p>Number sentences in mathematics introduce the passive voice, which is very difficult for EAL/D students even in the Developing and Consolidating phases of English language learning (for example, When a number is added to 23 ...).</p>	<p>Reword sentences to help EAL/D students see the process required (for example, ‘23 plus which number ...’) and show how this instruction can also be worded as ‘When a number is added to 23 ...’</p> <p>Use visuals, including number lines, to support students in the Beginning and Emerging phases of English language learning.</p>
<p>Statistics and probability</p> <p>Describe possible everyday events and order their chances of occurring (ACMSP092)</p>	<p>The mathematical meanings in the expressions least likely, more likely, most likely are dependent upon an understanding of the nuances in the meanings of the words.</p>	<p>When teaching mathematical meanings, focus on the word meanings. Place the adverbs on a continuum of certainty: ‘least, more, and most’.</p>
<p>Statistics and probability</p> <p>Identify events where the chance of one will not be affected by the occurrence of the other (ACMSP094)</p>	<p>The language of comparison in English includes the use of the comparative adjective forms. For example, in Mathematics, chance and probability: ‘I think it is more likely that I will pull out a red peg.’ ‘In our survey, soccer was less popular than basketball.’</p> <p>For most native English speakers, this is intuitive knowledge that comes from a sense of what sounds right. EAL/D students are more efficiently taught this knowledge.</p>	<p>Provide EAL/D students in the Beginning and Emerging phases of English language learning with lists of the word forms, or sentence frames to support their English language use.</p>
<p>Statistics and probability</p> <p>Select and trial methods for data collection, including survey questions and recording sheets (ACMSP095)</p>	<p>In English, questions are formed in many ways and are quite challenging for EAL/D students. For example, making a question requires the learner to change the position of the verb and the subject (‘Can I?’) or else to use a question word (‘Why did this happen?’).</p>	<p>Monitor the language of EAL/D students when they pose questions, and explicitly teach English question forms.</p> <p>Provide model question structures that students can modify to suit their own data collection.</p>

CONTENT DESCRIPTIONS	LANGUAGE/CULTURAL CONSIDERATIONS	TEACHING STRATEGIES
<p>Statistics and probability</p> <p>Construct suitable data displays, with and without the use of digital technologies, from given or collected data. Include tables, column graphs and picture graphs where one picture can represent many data values (ACMSP096)</p>	<p>Diagrams in mathematics are informational, and are different from the images that students usually create intuitively. For example, tables and graphs require accuracy in size relationships and precision in line work.</p>	<p>Provide models of mathematical diagrams and tables in the same way as modelled written texts are provided to students. Discuss the features of the required visual texts.</p>

Annotated Content Descriptions | Mathematics

Year 5

CONTENT DESCRIPTIONS	LANGUAGE/CULTURAL CONSIDERATIONS	TEACHING STRATEGIES
<p>Measurement and geometry Choose appropriate units of measurement for length, area, volume, capacity and mass (ACMMG108)</p>	EAL/D students may bring developed knowledge about alternative units of measurement to the classroom.	Invite students to contribute what they know to small-group and whole-class discussions. If they are hesitant to talk, teachers can make reference to their understandings or frame information from their culture in positive ways.
<p>Measurement and geometry Connect three-dimensional objects with their nets and other two-dimensional representations (ACMMG111)</p>	Vocabulary in mathematics is often used in specialist ways that are different from everyday usage (for example, 'net', 'face').	Note the ways that words are being used in mathematical contexts and pre-empt possible confusion by drawing attention to the different meanings of the words. Build glossaries and charts of the ways that the same words can be used.
<p>Measurement and geometry Estimate, measure and compare angles using degrees. Construct angles using a protractor (ACMNA105)</p>	EAL/D students are unlikely to have had cumulative exposure to the Western Australian Curriculum and Assessment Outline and so may not have had experiences with equipment, as well as mathematical concepts.	Don't assume prior knowledge or experience with technical mathematical equipment.
<p>Measurement and geometry Use a grid reference system to describe locations. Describe routes using landmarks and directional language (ACMMG113)</p>	Words have different meanings in different contexts, and this can be especially challenging for EALD students. For example, in expressions such as 'How many are left?', 'left' asks the learner about a remainder; whereas in 'Turn left', 'left' gives a direction. These differences in meaning must be made clear to EAL/D students.	Support vocabulary with visuals (for example, arrows indicating left, right).
<p>Measurement and geometry Visualise and describe translations, reflections and rotations of two-dimensional shapes. Identify line and rotational symmetries (ACMMG114)</p>	The texts used in the learning areas often introduce sentence structures that are new learning and challenging for EAL/D students. Imperative sentences begin with verbs, unlike most other English sentences, and are a feature of instructional texts. In mathematics and science, the imperative sentences often start with specialist verbs (for example, ' Shade one quarter of the square.' ' Fold along the dotted line.').	Support students to read the instructions attached to tasks, provide modelling of the task required and build mathematical glossaries.

CONTENT DESCRIPTIONS	LANGUAGE/CULTURAL CONSIDERATIONS	TEACHING STRATEGIES
<p>Number and algebra Identify and describe factors and multiples of whole numbers and solve problems involving these (ACMNA098)</p>	Some EAL/D students will bring alternative problem-solving strategies with them to the mathematics classroom.	Be open to alternative mathematical strategies, being aware that EAL/D students in the Beginning and Emerging phases of English language learning will not have the oral language skills to explain their working. Bilingual assistants and parents can be useful resources.
<p>Number and algebra Use estimation and rounding to check the reasonableness of answers to calculations (ACMNA099)</p>	In 'everyday' mathematics language, we often use language that is challenging for all EAL/D students, despite our original intention to simplify. For example, 'How many times does 3 go into 17 ?' 'How many are left over ?'	For EAL/D students in the Beginning and Emerging phases of English language learning, consider more literal explanations or support metaphorical explanations with diagrams.
<p>Number and algebra Solve problems involving multiplication of large numbers by one- or two-digit numbers using efficient mental, written strategies and appropriate digital technologies (ACMNA100)</p>	EAL/D students with good mathematics skills in their first language often prefer to work with number in their first language.	Allow students to build their mathematical understandings in their first language while simultaneously working with them to build understanding of the language of mathematics in English.
<p>Number and algebra Compare and order common unit fractions and locate and represent them on a number line (ACMNA102)</p>	Vocabulary in mathematics can be challenging EAL/D students, when the same words perform different mathematical functions (for example, third = ordinal, third = fraction).	Ensure that EAL/D students understand the ways in which terminology is being used. Construct charts to represent fractions.
<p>Number and algebra Investigate strategies to solve problems involving addition and subtraction of fractions with the same denominators (ACMNA103)</p>	EAL/D students in the Beginning and Emerging phases of English language learning may have the mathematics concepts but not the language knowledge to solve word problems. EAL/D students in the Developing and Consolidating phases of English language learning may find the sentence structures of word problems challenging.	Provide visual scaffolds into word problems. Unpack the sentence structures required for writing mathematical word problems. For example, word problems often place the first direction to the reader at the end of the sentence.
<p>Number and algebra Compare order and represent decimals (ACMNA105)</p>	Different languages use different notational symbols, and some EAL/D students may have other expectations of mathematics symbols. For example, decimal points in some languages are marked with a comma.	Ensure shared understandings in the classroom about the function of mathematical notations.

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<p>Number and algebra Create simple financial plans and examine financial records (ACMNA106)</p>	<p>Some taken-for-granted information in Australian classrooms is not part of the cultural experiences of some EAL/D students. For example, receipts and invoices will not be in the cultural history of students from refugee camps.</p>	<p>Build shared understandings about the cultural concepts that underlie mathematical instruction in the classroom.</p>
<p>Number and algebra Describe, continue and create patterns with fractions, decimals and whole numbers resulting from addition and subtraction (ACMNA107)</p>	<p>While fractions and decimals appear to be 'language free', language must be used to instruct students in their meaning and for instructions.</p>	<p>Use everyday objects that can be 'divided' (such as paper that can be cut) or manipulatives to explicitly teach the vocabulary and equivalents in fractions, decimals and percentages.</p>
<p>Statistics and probability List outcomes of chance experiments involving equally likely outcomes and represent probabilities of those outcomes using fractions (ACMSP116)</p>	<p>The mathematical meanings in the expressions least likely, more likely, most likely are dependent upon an understanding of the nuances in the meanings of the words. The modal verbs in English (for example, 'will', 'may', 'might', 'should', 'could') modify the certainty of verbs and are mastered late in the language progression of EAL/D students.</p>	<p>When teaching mathematical meanings, focus on the word meanings. Place the adverbs on a continuum of certainty: 'least, more, most, may, might, must'.</p>
<p>Statistics and probability Pose questions and collect categorical or numerical data by observation or survey (ACMSP118)</p>	<p>In English, questions are formed in many ways and are quite challenging for EAL/D students. They can be formed by changing word order (for example, 'Are you from Australia?'), or by using question words (for example, 'Do you have a brother or sister?' 'How many brothers do you have?'), as well as the 'wh' question words: why, what, who, where.</p>	<p>Monitor the language of EAL/D students when they pose questions, and explicitly teach English question forms. Provide model question structures that students can modify to suit their own data collection.</p>
<p>Statistics and probability Construct displays appropriate for data types, with and without the use of digital technologies. Include column graphs, dot plots and tables (ACMSP119)</p>	<p>Diagrams in mathematics are informational, and are different from the images that students usually create intuitively. For example, tables and graphs require accuracy in size relationships and precision in line work.</p>	<p>Provide models of mathematical diagrams and tables in the same way as modelled written texts are provided to students. Discuss the features of the required visual texts.</p>

Annotated Content Descriptions | Mathematics

Year 6

CONTENT DESCRIPTIONS	LANGUAGE/CULTURAL CONSIDERATIONS	TEACHING STRATEGIES
<p>Measurement and geometry Connect decimal representations to the metric system (ACMMG135)</p>	<p>Different languages use different notational symbols, and some EAL/D students may have other expectations of mathematical symbols. For example, decimal points in Greek are marked with a comma rather than a full stop.</p>	<p>Ensure shared understandings in the classroom about the function of mathematical notations. Sharing different notations from different languages broadens the perspectives in the classroom and normalises difference.</p>
<p>Measurement and geometry Convert between common metric units of length, mass and capacity (ACMMG136)</p>	<p>The abbreviations used in these types of conversions may be unfamiliar and confusing to EAL/D students, who may or may not have encountered them before.</p>	<p>Teach these terms and their abbreviations explicitly and provide reference lists of them either around the classroom or individually for a student's own use.</p>
<p>Measurement and geometry Solve problems involving the comparison of lengths and areas using appropriate units (ACMMG137)</p>	<p>Word problems are challenging for EAL/D students, as it can be difficult to determine the operation needed from the language used. This is particularly relevant for EAL/D students in the Beginning and Emerging phases of English language learning when they may not be making sense of all words.</p> <p>Often, irrelevant material is included (and since many language only state that which is needed, this will further confuse EAL/D students). EAL/D students may have a much greater understanding of mathematical concepts than they are able to demonstrate if assessment occurs through word problems.</p>	<p>Teach the vocabulary of mathematics problems.</p> <p>Make explicit the links between words and numbers and operations by colour-coding (for example, highlight 'add' and + in the same colour).</p> <p>Allow EAL/D students to demonstrate their mathematical understanding through solving algorithms rather than word problems, while simultaneously building their language skills to solve word problems.</p>
<p>Measurement and geometry</p>	<p>The abbreviations used in these types of algorithms may be unfamiliar and confusing to EAL/D students, who may or may not have encountered them before.</p>	<p>Teach these terms and their abbreviations explicitly and provide reference lists of them either around the classroom or individually for a student's own use.</p>
<p>Measurement and geometry Interpret and use timetables (ACMMG139)</p>	<p>Time is approached differently in different cultures (for example, some cultures are extremely punctual; others consider time a less precise notion).</p>	<p>Invite students to explain how time and timetables work in their home cultures, and use this for both teacher knowledge and understanding and for a deeper understanding about the construct of time for the whole class.</p>

CONTENT DESCRIPTIONS	LANGUAGE/CULTURAL CONSIDERATIONS	TEACHING STRATEGIES
<p>Measurement and geometry Investigate, with and without digital technologies, angles on a straight line, angles at a point and vertically opposite angles. Use results to find unknown angles (UCMMG141)</p>	<p>EAL/D students who are in the Beginning and Emerging phases of English language learning are unlikely to have had cumulative exposure to the <i>Western Australian Curriculum and Assessment Outline</i> and so may not have had experiences with equipment, as well as mathematical concepts.</p>	<p>Do not assume prior knowledge or experience with technical mathematical equipment.</p>
<p>Measurement and geometry Investigate combinations of translations, reflections and rotation, with or without the use of digital technologies (ACMMG142)</p>	<p>The vocabulary required may be unfamiliar, and this will impede EAL/D students' ability to understand and perform the task.</p>	<p>Teach the vocabulary using modelled and shared approaches and vocabulary learning strategies such as word walls, lingo, snap and other games.</p>
<p>Number and algebra Identify and describe properties of prime, composite, square and triangular numbers (ACMNS122)</p>	<p>EAL/D students may come to the classroom with an alternative method for solving operations.</p>	<p>Teach the vocabulary using modelled and shared approaches and vocabulary learning strategies such as word walls, lingo, snap and other games.</p>
<p>Number and algebra Select and apply efficient mental and written strategies and appropriate digital technologies to solve problems involving all four operations with whole numbers (ACMNA123)</p>	<p>EAL/D students may come to the classroom with an alternative method for solving operations.</p>	<p>Invite students to explain their alternative strategies and use this to expand the repertoire of other students.</p>
<p>Number and algebra Compare fractions with related denominators and locate and represent them on a number line (ACMNA125)</p>	<p>Vocabulary in mathematics can be challenging when the same words perform different functions (for example, third = ordinal; third = fraction).</p>	<p>Ensure that EAL/D students understand the ways in which terminology is being used. Use illustrated glossaries or bilingual word walls to assist students to transfer their knowledge into the English learning environment.</p>
<p>Number and algebra Solve problems involving addition and subtraction of fractions with the same or related denominators (ACMNA126) Find a simple fraction of a quantity where the result is a whole number, with and without digital technologies (ACMNA127)</p>	<p>The contextual information often provided in word problems is difficult for many EAL/D students to understand and can distract from the maths task. EAL/D students may have a much greater understanding of mathematical concepts than they are able to demonstrate. I assessment occurs through word problems. EAL/D students are unlikely to have had cumulative exposure to the <i>Western Australian Curriculum and Assessment Outline</i> and so many not have had experiences with equipment, as well as mathematical concepts.</p>	<p>Provide visual scaffolds into word problems. Unpack the sentence structures required or writing mathematical word problems. For example, word problems often place the first direction to the reader at the end of the sentence.</p>

CONTENT DESCRIPTIONS	LANGUAGE/CULTURAL CONSIDERATIONS	TEACHING STRATEGIES
<p>Number and algebra</p> <p>Add and subtract decimals, with and without digital technologies, and use estimation and rounding to check the reasonable</p>	<p>EAL/D students in the Beginning and Emerging phases of English language learning are unlikely to have had cumulative exposure to the <i>Western Australian Curriculum and Assessment Outline</i> and so may not have had experiences with equipment, as well as mathematical concepts.</p>	<p>Provide scaffolds into maths tasks, including visual glossaries that identify the terminology and their commonly used symbols.</p>
<p>Number and algebra</p> <p>Multiply decimals by whole numbers and perform divisions that result in terminating decimals, with and without digital technologies (ACMNA129)</p>	<p>EAL/D students in the Beginning and Emerging phases of English language learning are unlikely to have had cumulative exposure to the <i>Western Australian Curriculum and Assessment Outline</i> and so may not have had experiences with equipment, as well as mathematical concepts.</p>	<p>Do not assume prior knowledge or experience of mathematical content, including the use of calculators.</p>
<p>Number and algebra</p> <p>Continue and create sequences involving whole numbers, fractions and decimals. Describe the rule used to create the sequence (ACMNA133)</p>	<p>Many EAL/D students will be able to demonstrate their mathematical knowledge by creating correct sequences, but may have limited English language skills to describe the rule used to create the sequence.</p> <p>It is important to differentiate between knowledge of the maths and use of mathematical language to describe that knowledge.</p>	<p>Provide models, including oral language models, of mathematical rules and their explanations.</p>
<p>Number and algebra</p> <p>Explore the use of brackets and order of operations to write number sentences (ACMNA134)</p>	<p>The use of brackets differs from language to language. In some languages they are represented as [], in others as < >, and in some languages standard brackets () may not be recognised automatically as they are in English.</p>	<p>Ensure that EAL/D students are clear about how brackets operate in math.</p>
<p>Statistics and probability</p> <p>Describe probabilities using fractions, decimals and percentages (ACMSP144)</p>	<p>Describing probability involves the languages of prediction, comparison and hypothesis, and these are all challenging for EAL/D students in all phases of English language learning.</p>	<p>Provide oral and written models of what descriptions of probability sound like.</p>
<p>Statistics and probability</p> <p>Compare observed frequencies across experiments with predicted frequencies (ACMSP146)</p>	<p>The mathematical meanings in expressions such as least likely, more likely, most likely are dependent upon an understanding of the nuances in the meaning of the words.</p>	<p>When teaching mathematical meanings, focus on word meanings. Place the adverbs on a continuum of certainty: 'least', 'more', 'most', 'may', 'might', 'must'.</p>

CONTENT DESCRIPTIONS	LANGUAGE/CULTURAL CONSIDERATIONS	TEACHING STRATEGIES
	<p>The modal verbs in English (for example, 'will', 'may', 'might') modify the certainty of verbs and are mastered late in the language progression of EAL/D students.</p>	
<p>Statistics and probability Interpret secondary data presented in digital media and elsewhere (ACMSP148)</p>	<p>EAL/D students have had varying experience with the <i>Western Australian Curriculum and Assessment Outline</i> and Australian social contexts. Familiarity with the digital media or the issues they may cover cannot be assumed.</p>	<p>Ensure that students are familiar with the social and cultural contexts of any secondary data they are required to use.</p>

Annotated Content Descriptions | Mathematics

Year 7

CONTENT DESCRIPTIONS	LANGUAGE/CULTURAL CONSIDERATIONS	TEACHING STRATEGIES
<p>Measurement and geometry Establish the formulas for areas of rectangles, triangles and parallelograms and use these in problem solving (ACMMG159)</p>	EAL/D students will come to the classroom with different levels of knowledge, and teachers will need to ascertain what these are and identify which skills need to be further developed.	Use concrete objects to explain this concept and allow students to demonstrate their knowledge of this in concrete or oral formats.
<p>Measurement and geometry Calculate volumes of rectangular prisms (ACMMG160)</p>	EAL/D students will come to the classroom with different levels of knowledge, and teachers will need to ascertain what these are and identify which skills need to be further developed.	Use concrete objects to explain this concept and allow students to demonstrate their knowledge of this in concrete objects that are relevant and have meaning.
<p>Measurement and geometry Draw different views of prisms and solids formed from combinations of prisms (ACMMG161)</p>	<p>Some EAL/D students may not be familiar with two-dimensional representations of three-dimensional figures.</p> <p>Mathematical shapes are named by subject-specific vocabulary, which may not have previously been encountered by EAL/D students.</p>	<p>Allow students to manipulate three-dimensional shapes and assist them in drawing these as two-dimensional shapes before attempting this skill.</p> <p>Provide illustrated glossaries or bilingual word walls to assist students in transferring their knowledge into the English learning environment.</p>
<p>Measurement and geometry Identify corresponding, alternate and co-interior angles when two parallel straight lines are crossed by a transversal (ACMMG163)</p>	Subject-specific language can be confusing for EAL/D students.	Allow students to use a picture dictionary or else have students create their own vocabulary list on which they draw the pictorial representation and have both English and their first language definitions.
<p>Measurement and geometry Investigate conditions for two lines to be parallel and solve simple numerical problems, using reasoning (ACMMG164)</p>	Reasoning and explaining require the language of cause and effect in English and the use of conjunctions, which appear later in the language progression of EAL/D students ('because').	Teach the sentence structures and conjunctions required of this task.
<p>Measurement and geometry Classify triangles according to their side and angle properties and describe quadrilaterals (ACMMG165)</p>	Different cultures have different ways of classifying objects.	Create retrieval charts that explicitly state the categories required.

CONTENT DESCRIPTIONS	LANGUAGE/CULTURAL CONSIDERATIONS	TEACHING STRATEGIES
<p>Measurement and geometry Describe translations, reflections in an axis, and rotations of multiples of 90° on the Cartesian plane using coordinates. Identify line and rotational symmetries (ACMMG181)</p>	<p>The vocabulary required may be unfamiliar, and this will impede EAL/D students' ability to understand and perform this task.</p>	<p>Teach the vocabulary using modelled and shared approaches and vocabulary learning strategies such as word walls, lingo, snap and other games.</p>
<p>Number and algebra Investigate index notation and represent whole numbers as products of powers of prime numbers (ACMNA149)</p>	<p>Index notation is an abstract way of representing numbers, and EAL/D students may not have the cumulative learning or background to understand this concept.</p>	<p>Use bilingual teaching assistants, where available, to help students learn this concept in their first language before trying to express it in an additional language. Explicitly note the difference between 4×2 and 4^2 to avoid confusion between these two operations. Teach the language around them also (for example, 'four times two' and 'four to the power of two') so that students can learn how to describe them when required.</p>
<p>Number and algebra Investigate and use square roots of perfect squares (ACMNA149)</p>	<p>Index notation is an abstract way of representing numbers, and EAL/D students may not have the cumulative learning or background to understand this concept.</p>	<p>Use bilingual teaching assistants where available to help students learn this concept in their first language before trying to express it in an additional language. Explicitly note the difference between 4×2 and 4^2 to avoid confusion between these two operations. Teach the language around them also (for example, 'four times two' and 'four to the power of two') so that students can learn how to describe them when required.</p>
<p>Number and algebra Apply the associative, commutative and distributive laws to aid mental and written computation (ACMNA151)</p>	<p>While algorithms appear to be 'language free', the explanations that accompany their use require the use of language.</p>	<p>Monitor spoken instructions and explanations to ensure that the language used is commensurate with where students are on the EAL/D language learning progression.</p>
<p>Number and algebra Compare fractions using equivalence. Locate and represent fractions and mixed numerals on a number line (ACMNA152)</p>	<p>Specific language is used for comparisons – adding '–er' to form the comparative (for example, 'bigger') and 'the' plus '–est' to form the superlative (for example, 'the biggest'), as well as associated prepositions ('bigger than', 'larger when compared to ...').</p>	<p>Explain to students that comparisons of two objects are made by adding '–er' and comparisons of three or more objects by adding 'the' and '–est'. Explain that single-syllable words are preceded by 'more', 'less' (non-countable nouns) or 'fewer' (countable nouns) rather than by adding a suffix.</p>

CONTENT DESCRIPTIONS	LANGUAGE/CULTURAL CONSIDERATIONS	TEACHING STRATEGIES
		Provide lists of irregular comparative adjectives (for example, 'good', 'better', 'best').
<p>Number and algebra Solve problems involving addition and subtraction of fractions including those with unrelated denominators (ACMNA153)</p>	<p>There are many words to describe the same functions for both addition and subtraction. EAL/D students may become confused if these are constantly interchanged.</p> <p>Word problems are challenging for EAL/D students, as it can be difficult to determine the operation needed from the language used. This is particularly relevant for EAL/D students in the Beginning and Emerging phases of English language learning when they may not be making sense of all words.</p> <p>Contextual material is often included in word problems, which adds a cultural or linguistic dimension to the maths problem. This extra information may distract or confuse EAL/D students, who may have a much greater understanding of mathematical concepts than they are able to demonstrate through word problems.</p>	<p>Prepare wall charts of the different terms used to describe each function and build knowledge of the different terms with the class.</p> <p>Teach students to identify the irrelevant context-building material in the question and to cross this out.</p> <p>Model how to find the operations in word problems when they are described differently in different questions.</p>
<p>Number and algebra Multiply and divide fractions and decimals using efficient written strategies and appropriate digital technologies (ACMNA154)</p>	<p>There are many words to describe the same functions for both multiplication and division. EAL/D students may become confused if these are constantly interchanged.</p>	<p>Prepare wall charts of the different terms used to describe each function and build knowledge of the different terms with the class. These strategies will need to be scaffolded and explained through the use of exemplar texts, modelling, joint deconstruction, joint reconstruction and then independent construction, so that students understand what is required of them.</p>
<p>Number and algebra Express one quantity as a fraction of another with and without the use of appropriate digital technologies (ACMNA155)</p>	<p>Part/whole relationships may be taught differently in different cultures.</p> <p>Number words often reflect the number concepts they represent, and place value is attributed by a common suffix.</p>	<p>If students are finding this concept difficult, use manipulatives to demonstrate fractions in a concrete way.</p> <p>To assist with comprehension, teach the language of fractions and the concept of number fractions concurrently (for example, one fifth, one fifteenth, one twenty-fifth, one fiftieth).</p>

CONTENT DESCRIPTIONS	LANGUAGE/CULTURAL CONSIDERATIONS	TEACHING STRATEGIES
<p>Number and algebra Connect fractions, decimals and percentages and carry out simple conversions (ACMNA157)</p>	<p>The vocabulary required may be unfamiliar, and this will impede EAL/D students' ability to understand and perform this task.</p>	<p>Use everyday objects that can be 'divided' (such as paper that can be cut) or manipulatives to explicitly teach the vocabulary and equivalents in fractions, decimals and percentages first.</p>
<p>Number and algebra Find percentages of quantities and express one quantity as a percentage of another, with and without digital technologies (ACMNA158)</p>	<p>EAL/D students in the Beginning and Emerging phases of English language learning are unlikely to have had cumulative exposure to the <i>Western Australian Curriculum and Assessment Outline</i> and so may not have had experiences with equipment, as well as mathematical concepts.</p>	<p>Do not assume prior knowledge or experience of mathematical content, or experience with technology such as calculators.</p>
<p>Number and algebra Investigate and calculate best buys, with and without digital technologies (ACMNA174)</p>	<p>The language used to describe hypothetical comparisons is quite advanced (for example, 'would be a better buy' – conditional). Some cultures do not hold the same concept of 'exactness' as Western culture. This means that fine-grained differentiation of what is more economical than another item may cause these students difficulty. The requirements of 'investigate' may not be known.</p>	<p>Model the grammar required (use of the conditional) to express results for EAL/D students in the Developing and Consolidating phases of English language learning. Students in the Beginning phase may give one-word answers supported by numerical working to minimise the linguistic demands of answering the question. Provide students with more concrete support (that is role play) in the first instance, rather than proceeding directly to an abstraction on paper. Teach the text organisation, language and grammar required for this.</p>
<p>Number and algebra Introduce the concept of variables as a way of representing numbers using letters (ACMNA175)</p>	<p>EAL/D students in the Beginning phase of English language learning and who are new to the English script/alphabet may find this use of letters confusing.</p>	<p>Use a bilingual assistant, where available, or a more able student from the same language background to explain this concept in the student's first language.</p>
<p>Number and algebra Write algebraic expressions and evaluate them by substituting a given value for each variable (ACMNA176)</p>	<p>EAL/D students in the Beginning phase of English language learning and who are new to the English script/alphabet may find this use of letters confusing.</p>	<p>Use a bilingual assistant, where available, or a more able student from the same language background to explain this concept in the student's first language.</p>
<p>Number and algebra Extend and apply the laws and properties of arithmetic to algebraic terms and expressions (ACMNA177)</p>	<p>EAL/D students in the Beginning and Emerging phases of English language learning are unlikely to have had cumulative exposure to the <i>Western Australian Curriculum and Assessment Outline</i> and so may not</p>	<p>Ensure that students understand arithmetic properties deeply before attempting to generalise them (algebra).</p>

CONTENT DESCRIPTIONS	LANGUAGE/CULTURAL CONSIDERATIONS	TEACHING STRATEGIES
	have had experiences with equipment, as well as mathematical concepts.	
<p>Number and algebra</p> <p>Plot points on the Cartesian plane given coordinates and find coordinates for a given point (ACMNA178)</p>	This concept is abstract, and some students may have difficulty understanding the connection to real-life situations.	Have students stand on coordinate points on a 'human grid' (each student is an ordered pair). Students say what their coordinates are and those of the other students when quizzed.
<p>Number and algebra</p> <p>Investigate, interpret and analyse graphs from authentic data (ACMNA180)</p>	Explaining an interpretation and analysis of a graph requires specific types of language (for example, use of the present tense for a finding such as 'The graph suggests that ...', 'Data indicates that ...').	<p>Explain, model and explicitly teach this language prior to requiring a response from students.</p> <p>Supply a generic list of commonly used expressions such as those given in the example.</p> <p>Use contexts that students can relate to and are meaningful.</p>
<p>Statistics and probability</p> <p>Construct sample spaces for single-step experiments with equally likely outcomes (ACMSP167)</p>	EAL/D students may not have the required prior learning for this due to their continuous entry into the Australian school system at any year level.	Use modelling to explicitly teach what a 'sample space' is and have students generate their own journey during experiments.
<p>Statistics and probability</p> <p>Assign probabilities to the outcomes and determine probabilities for events (ACMSP168)</p>	EAL/D students may not have the required prior learning for this.	Use the language of fractions in a 'probabilistic sense' (for example, $\frac{1}{4} = 1$ in 4 chances).
<p>Statistics and probability</p> <p>Construct and compare a range of data displays including stem and leaf plots and dot plots (ACMSP170)</p>	Specific language is used for comparisons – adding '–er' to form the comparative (for example, 'bigger') and 'the' plus '–est' to form the superlative (for example, 'the biggest'), as well as associated prepositions ('bigger than', 'larger when compared to ...').	<p>Explain to students that comparisons of two objects are made by adding '–er' and comparisons of three or more objects by adding 'the' and '–est'.</p> <p>Explain that single-syllable words are preceded by 'more' or 'less' rather than by adding a suffix.</p> <p>Give lists of irregular comparative adjectives (for example, 'good', 'better', 'best').</p>
<p>Statistics and probability</p> <p>Describe and interpret data displays and the relationship between the median and mean (ACMSP172)</p>	The language needed to both describe and demonstrate an interpretation of the information may present difficulty for EAL/D students.	<p>Clearly model how the description should be structured. Provide a selection of key phrases that can be used in the interpretation.</p> <p>Use meaningful data concepts such as the occupations or gender of family members.</p>

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Year 8

CONTENT DESCRIPTIONS	LANGUAGE/CULTURAL CONSIDERATIONS	TEACHING STRATEGIES
<p>Measurement and geometry Choose appropriate units of measurement for area and volume and convert from one unit to another (ACMMG195)</p>	Abbreviations relevant to this skill (cm, m, km, ml, l) are often considered to be known language, but EAL/D students may not have had exposure to these.	<p>Teach source words to support the students in understanding the abbreviation.</p> <p>Have charts of abbreviations available.</p>
<p>Measurement and geometry Find perimeter and area of parallelograms, rhombuses and kites (ACMMG196)</p>	EAL/D students may have difficulty with identifying the name for each shape, as this is subject-specific terminology.	Provide labelled models of these shapes.
<p>Measurement and geometry Investigate the relationship between features of circles such as circumference, area, radius and diameter. Use formulas to solve problems involving circumference and area (ACMMG197)</p>	Abbreviations relevant to this skill (for example, 'C' for circumference) are often considered to be known language, but EAL/D students may not have had exposure to these.	<p>Teach source words to support the students in understanding the abbreviation (for example, A = area, r = radius).</p> <p>Have charts of abbreviations available.</p> <p>Teach investigations as a text form, including headings, vocabulary, tense and structure.</p>
<p>Measurement and geometry Solve problems involving time duration, including using 12- and 24-hour time within a single time zone (ACMMG199)</p>	The telling of time is constructed differently in different languages, and this often reflects concepts of time in different cultures. Some EAL/D students may never have used 24-hour time; others may be confused if it is not used. Others may still use approximations (for example, 'long, long time').	Teach the language structures of telling the time, being aware of possible linguistic differences to better understand if problems with time-telling are linguistic or cultural.
<p>Measurement and geometry Define congruence of plane shapes using transformations (ACMMG200)</p>	The vocabulary required may be unfamiliar to EAL/D students and therefore cause confusion.	Teach the vocabulary needed (such as 'congruent', 'plain shapes', '3D shapes', 'reflections', 'translations', 'rotations') using picture cards, bingo, 'shapes snap' and concentration.
<p>Measurement and geometry Establish properties of quadrilaterals using congruent triangles and angle properties, and solve related numerical problem using reasoning (ACMMG202)</p>	Reasoning and explaining require the language of cause and effect in English and the use of conjunctions, which appear later in the EAL/D language learning progression (for example, 'because').	Teach the sentence structures and conjunctions required of this task, as well as how to reason, by teacher modelling (talking aloud while doing it so that students can hear the process).

CONTENT DESCRIPTIONS	LANGUAGE/CULTURAL CONSIDERATIONS	TEACHING STRATEGIES
<p>Number and algebra</p> <p>Use index notation with numbers to establish the index laws with positive integral indices and the zero index (ACMNA182)</p>	<p>EAL/D students may not have the necessary prior knowledge to use index notation.</p>	<p>Teach index laws with examples.</p>
<p>Number and algebra</p> <p>Carry out the four operations with integers, using efficient mental and written strategies and appropriate digital technologies (ACMNA183)</p>	<p>There are many words to describe operations. EAL/D students may become confused if these are constantly interchanged.</p> <p>Efficient written strategies are culturally specific. Some cultures will require extremely direct writing, while others will require extended explanation.</p>	<p>Prepare wall charts of the different terms used to describe each operation and build knowledge of the different terms with the class.</p> <p>These will need to be scaffolded and explained through the use of exemplar texts, modelling, joint deconstruction, joint reconstruction and then independent construction so that students understand what is required of them.</p>
<p>Number and algebra</p> <p>Investigate terminating and recurring decimals (ACMNA184)</p>	<p>Not all EAL/D students will have received the prior grounding in place value to understand the concept of decimals.</p>	<p>Provide discrete individual support in this area which may enable students to better grasp this concept.</p>
<p>Number and algebra</p> <p>Investigate the concept of irrational numbers, including π (ACMNA186)</p>	<p>Mathematical vocabulary can cause confusion for EAL/D students as they may have learnt 'homophonic' partners (for example, 'pi', 'pie').</p>	<p>Teach the subject-specific terms and their spellings, and draw attention to how they differ with homophones in English (for example, 'sine', 'sign').</p>
<p>Number and algebra</p> <p>Solve problems involving the use of percentages, including percentage increases and decreases, with and without digital technologies (ACMNA187)</p>	<p>Word problems are challenging for EAL/D students, as it can be difficult to determine the operation needed from the language used. This is particularly relevant in the Beginning and Emerging phases of English language learning when students may not be making sense of all words.</p> <p>Contextual material is often included in word problems, which adds a cultural or linguistic dimension to the maths problem.</p> <p>This extra information may distract or confuse EAL/D students, who may have a much greater understanding of mathematical concepts than they are able to demonstrate if assessment occurs through word problems.</p>	<p>Teach students to identify the irrelevant context-building material in the question and to cross this out.</p> <p>Model how to find the operations in word problems when they are described differently in different questions.</p>

CONTENT DESCRIPTIONS	LANGUAGE/CULTURAL CONSIDERATIONS	TEACHING STRATEGIES
<p>Number and algebra Solve problems involving profit and loss, with and without digital technologies (ACMNA189)</p>	<p>EAL/D students in the Beginning and Emerging phases of English language learning are unlikely to have had cumulative exposure to the <i>Western Australian Curriculum and Assessment Outline</i> and so may not have had experiences with equipment, as well as mathematical concepts.</p>	
<p>Number and algebra Extend and apply the distributive law to the expansion of algebraic expressions (ACMNA190)</p>	<p>Using letters to represent numbers may cause confusion for a student with a limited literacy background and is who still learning that letters make words.</p>	<p>Clear explanation must accompany this, particularly for students who are in the Beginning and Emerging phases of English language learning.</p>
<p>Number and algebra Factorise algebraic expressions by identifying numerical factors (ACMNA191)</p>	<p>Using letters to represent numbers may cause confusion for a student with a limited literacy background and who is attempting to learn the letters.</p>	<p>Explain clearly that letters also represent numbers in mathematics, particularly for students who are in the Beginning and Emerging phases of English language learning.</p>
<p>Number and algebra Simplify algebraic expressions involving the four operations (ACMNA192)</p>	<p>Using letters to represent numbers may cause confusion for a student with a limited literacy background and who is attempting to learn the letters. The use of letters may require specific explanation to some students.</p>	<p>Explain clearly that letters also represent numbers in mathematics, particularly for students who are in the Beginning and Emerging phases of English language.</p>
<p>Number and algebra Plot linear relationships on the Cartesian plane with and without the use of digital technologies (ACMNA193)</p>	<p>This concept is abstract, and some EAL/D students may have difficulty understanding the connection to real-life situations.</p>	<p>Scaffold students into the learning by providing clear graphics and an annotated visual glossary of terms and symbols. Have students stand on coordinate points on a 'human grid' (each student is an ordered pair) and say what their coordinates are and those of the other students when quizzed.</p>
<p>Number and algebra Solve linear equations using algebraic and graphical techniques. Verify solutions by substitution (ACMNA194)</p>	<p>While algebraic and graphical techniques use visuals and symbols, the explanations of the meanings of these are made using spoken language and specific vocabulary.</p>	<p>Provide clear models of the graphical techniques, and monitor oral instructions to ensure that the language of instruction is at a level commensurate with where the students are on the EAL/D learning progression.</p>
<p>Statistics and probability Identify complementary events and use the sum of probabilities to solve problems (ACMSP204)</p>		<p>Provide models, spoken and written, of the language required to show evidence of understanding of these concepts.</p>

CONTENT DESCRIPTIONS	LANGUAGE/CULTURAL CONSIDERATIONS	TEACHING STRATEGIES
<p>Statistics and probability</p> <p>Describe events using language of ‘at least’, exclusive ‘or’ (A or B but not both), inclusive ‘or’ (A or B or both) and ‘and’ (ACMSP205)</p>	<p>These ‘little’ words (‘and’, ‘or’, ‘but’) in English often cause the greatest confusion, as they are difficult to distinguish.</p>	<p>Explain and demonstrate what each word or expression means and ensure that these are clearly explained when introducing the concept.</p>
<p>Statistics and probability</p> <p>Represent such events in two-way tables and Venn diagrams and solve related problems (ACMSP292)</p>	<p>Two-way tables and Venn diagrams require analysis of events, their commonalities and differences. Comparative terms such as both, some, neither and either will be required to interpret the information.</p>	<p>Teach these terms and model examples. Allow EAL/D students to practise this language both orally and in written form.</p>
<p>Statistics and probability</p> <p>Explore the variation of means and proportions in representative data (ACMSP293)</p> <p>Investigate the effect of individual data values, including outliers, on the mean and median (ACMSP207)</p>	<p>Subject-specific vocabulary is challenging for EAL/D students, as many will have had limited exposure to these words, depending upon their time in Australian schools. In Mathematics, for example, words such as ‘mean’ and ‘median’ may not have been encountered by EAL/D students in a statistical context, but they may have more common sense understandings of the words.</p>	<p>Identify vocabulary, particularly homonyms (words that look and sound the same), with specific mathematical meanings and talk about the multiple meanings of the word, while making explicit its meaning in a mathematical context (for example, ‘mean’).</p>

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Year 9

CONTENT DESCRIPTIONS	LANGUAGE/CULTURAL CONSIDERATIONS	TEACHING STRATEGIES
<p>Measurement and geometry Calculate the surface area and volume of cylinders and solve related problems (ACMMG217)</p>	Abbreviations relevant to this skill are often considered to be known language, but EAL/D students may not have had exposure to these.	<p>Teach source words to support the students in understanding the abbreviation.</p> <p>Have charts of abbreviations available.</p>
<p>Measurement and geometry Solve problems involving surface area and volume of right prisms (ACMMG218)</p>	Abbreviations relevant to this skill (for example, A = area, V = volume) are often considered to be known language, but EAL/D students may not have had exposure to these.	<p>Teach source words to support the students in understanding the abbreviation.</p> <p>Have charts of abbreviations available.</p>
<p>Measurement and geometry Use the enlargement transformation to explain similarity and develop the conditions for triangles to be similar (ACMMG220)</p>	The vocabulary and sentence structures needed for this skill may impede an EAL/D learner from demonstrating their knowledge.	<p>Provide opportunities for students to show knowledge that is not language based; for example, physical manipulation of objects or the use of visuals.</p> <p>Model spoken language explanations of similarity and provide opportunities for EAL/D students to repeat those explanations for similar problems using the same sentence structure.</p> <p>Use vocabulary games such as snap and bingo to develop vocabulary.</p>
<p>Measurement and geometry Use similarity to investigate the constancy of the sine, cosine and tangent ratios for a given angle in right-angled triangles (ACMMG223)</p>	Abbreviations relevant to this skill are often considered to be known language, but EAL/D students may not have had exposure to these.	<p>Teach source words to support the students in understanding the abbreviation.</p> <p>Have charts of abbreviations available.</p>
<p>Number and algebra Solve problems involving direct proportion. Explore the relationship between the graphs and equations corresponding to simple rate problems (ACMNA208)</p>	Word problems are challenging for EAL/D students, as it can be difficult to determine the operation needed from the language used. This is particularly relevant for EAL/D students in the Beginning and Emerging phases of English language learning when students may not be making sense of all words.	<p>Teach students to identify the irrelevant contextual material in the question and to cross this out.</p> <p>Focus on how the operations are described differently in different questions.</p>

CONTENT DESCRIPTIONS	LANGUAGE/CULTURAL CONSIDERATIONS	TEACHING STRATEGIES
	<p>Contextual material is often included in word problems, which adds a cultural or linguistic dimension to the maths problem. This extra information may distract or confuse EAL/D students, who may have a much greater understanding of mathematical concepts than they are able to demonstrate if assessment occurs through word problems.</p>	
<p>Number and algebra Solve problems involving simple interest (ACMNA211)</p>	<p>Word problems are challenging for EAL/D students, as it can be difficult to determine the operation needed from the language used. This is particularly relevant for students in the Beginning and Emerging phases of English language learning when they may not be making sense of all words.</p> <p>Contextual material is often included in word problems, which adds a cultural or linguistic dimension to the maths problem. This extra information may distract or confuse EAL/D students, who may have a much greater understanding of mathematical concepts than they are able to demonstrate if assessment occurs through word problems.</p>	<p>Teach students to identify the irrelevant contextual material in the question and to cross this out or ensure that the cultural information embedded in the word problem is explained. For example, visiting a bank, roleplaying an exchange between a customer seeking to hire purchase and a sales assistant in a department store.</p> <p>Focus on how the operations are described differently in different questions.</p>
<p>Number and algebra Apply the distributive law to the expansion of algebraic expressions, including binomials, and collect like terms where appropriate (ACMNA213)</p>	<p>Using letters to represent numbers may cause confusion for a student with a limited literacy background and who is still learning that letters represent sounds.</p>	<p>Explain clearly that letters can also represent numbers in Mathematics, particularly for EAL/D students who are in the Beginning phase of English language learning).</p>
<p>Number and algebra Find the distance between two points located on a Cartesian plane using a range of strategies, including graphing software (ACMNA214)</p>	<p>Many specialist maths terms (for example, 'Cartesian plane') will not have been encountered before. Some EAL/D students may be familiar with the maths but not the terminology.</p>	<p>Teach required technical language. Use alternative strategies that make use of gesture and visuals to support EAL/D students' understanding of the concept and support their language development. For example, creating a Cartesian plane in the school courtyard and plotting student positions.</p>

CONTENT DESCRIPTIONS	LANGUAGE/CULTURAL CONSIDERATIONS	TEACHING STRATEGIES
<p>Number and algebra</p> <p>Find the midpoint and gradient of a line segment (interval) on the Cartesian plane using a range of strategies, including graphing software (ACMNA294)</p>		<p>Teach the required technical language. Do not assume prior knowledge, relevant vocabulary or experience of mathematical content.</p>
<p>Number and algebra</p> <p>Sketch linear graphs using the coordinates of two points (ACMNA215)</p>	<p>Graphing, although visual, still requires the use of language in the teacher instructions and students' accounts of what they have understood.</p> <p>Many specialist maths terms (for example, 'linear graphs') will not have been encountered before. Some EAL/D students may be familiar with the maths but not the terminology.</p>	<p>Teach the required technical language.</p> <p>Monitor the language of teacher instruction to ensure that it is at a level commensurate with the student's phase of English language learning. Gesture and visuals clearly linked to the oral language are helpful. With EAL/D students in the Beginning and Emerging phases of English language learning, avoid additional information or observations that are extraneous to the task at hand, as these can distract.</p>
<p>Number and algebra</p> <p>Sketch simple non-linear relations with and without the use of digital technologies (ACMNA296)</p>	<p>Many specialist maths terms (for example, 'surds') will not have been encountered before. Some EAL/D students may be familiar with the maths but not the terminology.</p>	<p>Teach the technical language of this process.</p>
<p>Statistics and probability</p> <p>List all outcomes for two-step chance experiments, both with and without replacement, using tree diagrams or arrays. Assign probabilities to outcomes and determine probabilities for events (ACMSP225)</p>	<p>The language required to express probability requires knowledge of tense structures such as the conditional tenses (for example, 'if x then y will occur'; 'if x occurred then y would occur'; 'if x had happened then y would have occurred') and linguistic structures.</p> <p>such as comparative language (for example, 'more likely than') and modal verbs (for example, 'may', 'might', 'will', 'would').</p>	<p>Provide modelling and examples of the ways that these outcomes can be expressed, so that students can use these to present their own findings.</p>
<p>Statistics and probability</p> <p>Calculate relative frequencies from given or collected data to estimate probabilities of events involving 'and' or 'or' (ACMSP226)</p>	<p>These 'little' words ('and', 'or', 'but') in English often cause the greatest confusion, as they are difficult to distinguish.</p>	<p>Explain and demonstrate what each word or expression means and ensure that these are clearly explained when introducing the concept.</p>

CONTENT DESCRIPTIONS	LANGUAGE/CULTURAL CONSIDERATIONS	TEACHING STRATEGIES
<p>Statistics and probability Investigate reports of surveys in digital media and elsewhere for information on how data was obtained to estimate population means and medians (ACMSP227)</p>	<p>Questioning ‘authority’ sources is not a skill taught in some cultures. EAL/D students may find this task confronting.</p>	<p>Reassure students that it is necessary to question the validity of surveys and assist them in the language needed to express their findings. Teach investigation as a text form – structure, organisation, tenses and vocabulary.</p>
<p>Statistics and probability Identify everyday questions and issues involving at least one numerical and at least one categorical variable, and collect data directly from secondary sources (ACMSP228)</p>	<p>Forming questions in English can be done in different ways, such as the use of question words (for example, ‘Why’, ‘What’, ‘How many’) or a change in word order (for example, ‘Can it ...’).</p>	<p>Provide models of questions that students can use as a basis for their own work.</p>

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Year 10

CONTENT DESCRIPTIONS	LANGUAGE/CULTURAL CONSIDERATIONS	TEACHING STRATEGIES
<p>Measurement and geometry</p> <p>Solve problems involving surface area and volume of a range of prisms, cylinders and composite solids (ACMMG242)</p>	<p>Abbreviations relevant to this skill are often considered to be known language, but EAL/D students may not have had exposure to these.</p>	<p>Teach source words and support the students in understanding the abbreviation. Have charts of abbreviations available.</p>
<p>Number and algebra</p> <p>Connect the compound interest formula to repeated applications of simple interest using appropriate digital technologies (ACMNA229)</p>	<p>Students from a limited schooling background may not have the required background knowledge to understand or attempt this skill.</p> <p>They may also lack some of the cultural understandings that may accompany word problems which attempt to contextualise the concept of compound interest.</p>	<p>Teach the skills on which this more difficult Mathematics is based. Intensive support is needed in this instance.</p> <p>Teach the contextual information surrounding problems as well as the maths skill, to allow EAL/D students to connect the maths with real-life situations.</p>
<p>Number and algebra</p> <p>Factorise algebraic expressions by taking out a common algebraic factor (ACMNA230)</p>	<p>Using letters to represent numbers may cause confusion for a student with a limited literacy background and who is still learning that letters represent sounds.</p>	<p>Explain the process of using letters to represent numbers in Mathematics, through scaffolding using visual or concrete stimulus, particularly for EAL/D students who are in the Beginning phase of English language learning.</p>
<p>Number and algebra</p> <p>Simplify algebraic products and quotients using index laws (ACMNA231)</p>		<p>Explain the use of index laws, through scaffolding using visual or concrete stimulus, particularly for EAL/D students who are in the Beginning and Emerging phases of English language learning.</p>
<p>Number and algebra</p> <p>Apply the four operations to simple algebraic fractions with numerical denominators (ACMNA232)</p>	<p>Students from a limited schooling background may not have the required background knowledge to understand or attempt this skill.</p>	<p>Teach the skills on which this more difficult mathematics is based. Intensive support is needed in this instance.</p>
<p>Number and algebra</p> <p>Expand binomial products and factorise monic quadratic expressions using a variety of strategies (ACMNA233)</p>	<p>EAL/D students may not understand which strategies can be used. Some EAL/D students may have come from systems where they are competent in maths skills and may have alternative strategies for solving maths tasks.</p>	<p>Model and 'talk aloud' the thinking processes used, modelling multiple strategies.</p> <p>Ask EAL/D students with advanced maths skills to share their solutions and strategies with the class, and hence expand and confirm all students' understanding of the existence of multiple strategies.</p>

CONTENT DESCRIPTIONS	LANGUAGE/CULTURAL CONSIDERATIONS	TEACHING STRATEGIES
<p>Number and algebra Solve problems involving linear equations, including those derived from formulas (ACMNA235)</p>	<p>Word problems are challenging for EAL/D students, as it can be difficult to determine the operation needed from the language used. This is particularly relevant for students in the Beginning and Emerging phases of English language learning when they may not be making sense of all words.</p> <p>Contextual material is often included in word problems, which adds a cultural or linguistic dimension to the maths problem. This extra information may distract or confuse EAL/D students, who may have a much greater understanding of mathematical concepts than they are able to demonstrate if assessment occurs through word problems.</p>	<p>Teach students to identify the irrelevant material in the question and to cross this out.</p> <p>Focus on how the operations are described differently in different questions.</p>
<p>Number and algebra Solve linear simultaneous equations, using algebraic and graphical techniques including using graphing software (ACMNA237)</p>	<p>Students from a limited schooling background may not have the required background knowledge to understand or attempt this skill.</p>	<p>Teach the skills on which this more difficult mathematics is based. Intensive support is needed in this instance.</p>
<p>Number and algebra Explore the connections between algebraic and graphical representations of relations such as simple quadratics, circles and exponentials using graphing software as appropriate (ACMNA239)</p>	<p>Some EAL/D students may need support in understanding these connections.</p>	<p>Model and 'talk aloud' the thinking processes used.</p>
<p>Statistics and probability Describe the results of two- and three-step chance experiments, both with and without replacements, assign probabilities to outcomes and determine probabilities of events. Investigate the concept of independence (ACMSP246)</p>	<p>The language required to express probability requires knowledge of tense structures such as the conditional and linguistic structures such as comparative language and modal verbs.</p>	<p>Provide modelling and examples of the ways that these outcomes can be expressed, so that students can use these to present their own findings.</p>
<p>Statistics and probability Use the language of 'if ... then', 'given', 'of', 'knowing that' to investigate conditional statements and identify common mistakes in interpreting such language (ACMSP247)</p>	<p>Students who are still trying to learn this language will not be able to identify mistakes in its use.</p>	<p>Demonstrate and explain the common mistakes in investigating conditional statements.</p> <p>Pair the EAL/D learner with a non-EAL/D learner and give students time to solve this in group work.</p>

CONTENT DESCRIPTIONS	LANGUAGE/CULTURAL CONSIDERATIONS	TEACHING STRATEGIES
<p>Statistics and probability Compare shapes of box plots to corresponding histograms and dot plots (ACMSP250)</p>	<p>Specific language is used for comparisons – adding ‘-er’ to form the comparative (for example, ‘bigger’) and ‘the’ plus ‘-est’ to form the superlative (for example, ‘the biggest’), as well as associated prepositions (‘bigger than’, ‘larger when compared to ...’).</p>	<p>Explain to students that comparisons of two objects are made by adding ‘-er’ and comparisons of three or more objects by adding ‘the’ and ‘-est’.</p> <p>Explain that single-syllable words are preceded by ‘more’ or ‘less’ rather than by adding a suffix.</p> <p>Provide lists of irregular comparative adjectives (for example, ‘good’, ‘better’, ‘best’).</p>
<p>Statistics and probability Use scatter plots to investigate and comment on relationships between two continuous variables (ACMSP251)</p>		<p>Model how to use scatter plots, displaying labelled visuals as a support.</p>
<p>Statistics and probability Evaluate statistical reports in the media and other places by linking claims to displays, statistics and representative data (ACMSP253)</p>	<p>Investigating reports in the media requires additional reading skills beyond reading statistical data. Media reports will include additional information that may highlight linguistic or cultural knowledge gaps in EAL/D students.</p>	<p>Provide support for reading media reports, unpacking the ways in which statistical data from graphs can be re-presented in prose.</p>

Annotated Content Descriptions | Mathematics

Year 10A

CONTENT DESCRIPTIONS	LANGUAGE/CULTURAL CONSIDERATIONS	TEACHING STRATEGIES
<p>Measurement and geometry</p> <p>Solve problems involving surface area and volume of right pyramids, right cones, spheres and related composite solids (ACMMG271)</p>	<p>EAL/D students in the Beginning and Emerging phases of English language learning are unlikely to have had cumulative exposure to the <i>Western Australian Curriculum and Assessment Outline</i> and so may not be familiar with the terminology or the mathematical concepts.</p> <p>Alternatively, they may come from school systems where they have learned the mathematical concepts to this level and perhaps beyond, but do not have the language to adequately demonstrate that understanding.</p>	<p>Identify the mathematical learning the students have had in previous schooling.</p> <p>Use visuals to support learning and think aloud problem solving.</p> <p>Ensure that vocabulary required to understand and complete the task is understood by all students.</p>
<p>Measurement and geometry</p> <p>Establish the sine, cosine and area rules for any triangle and solve related problems (ACMMG273)</p>	<p>Vocabulary in mathematics can be confusing for EAL/D students, particularly when homophones are used (for example, 'sine', 'sign').</p>	<p>Teach the vocabulary needed, its spelling, its pronunciation and point out other homophones, explaining the difference in meaning.</p> <p>Use word walls, glossaries.</p>
<p>Measurement and geometry</p> <p>Use the unit circle to define trigonometric functions, and graph them, with and without the use of digital technologies (ACMMG274)</p>	<p>Many specialist maths terms (for example, 'trigonometry') will not have been encountered before. Some EAL/D students may be familiar with the maths but not the terminology.</p>	<p>Teach maths vocabulary. The use of bilingual maths dictionaries would be supportive.</p>
<p>Measurement and geometry</p> <p>Solve simple trigonometric equations (ACMMG275)</p>	<p>Many specialist maths terms (for example, 'equations') will not have been encountered before. Some EAL/D students may be familiar with the maths but not the terminology.</p>	<p>Teach maths vocabulary. The use of bilingual maths dictionaries would be supportive.</p>
<p>Measurement and geometry</p> <p>Apply Pythagoras's theorem and trigonometry to solving 3-D problems in right-angled triangles (ACMMG276)</p>	<p>Many specialist maths terms (for example, 'theorem') will not have been encountered before. Some EAL/D students may be familiar with the maths but not the terminology.</p>	<p>Teach maths vocabulary. The use of bilingual maths dictionaries would be supportive.</p>
<p>Number and algebra</p> <p>Define rational and irrational numbers and perform operations with surds and fractional indices (ACMNA264)</p>	<p>Many specialist maths terms (for example, 'surds') will not have been encountered before. Some EAL/D students may be familiar with the maths but not the terminology.</p>	<p>Teach maths vocabulary. The use of bilingual maths dictionaries would be supportive.</p>

CONTENT DESCRIPTIONS	LANGUAGE/CULTURAL CONSIDERATIONS	TEACHING STRATEGIES
<p>Number and algebra Use the definition of a logarithm to establish and apply the laws of logarithms (ACMNA265)</p>	<p>EAL/D students in the Beginning and Emerging phases of English language learning are unlikely to have had cumulative exposure to the <i>Western Australian Curriculum and Assessment Outline</i> and so may not be familiar with the terminology or the mathematical concepts.</p> <p>Alternatively, they may come from school systems where they have learned the mathematical concepts to this level and perhaps beyond, but do not have the language to adequately demonstrate that understanding.</p>	<p>Provide models of the required language, both oral and written, that the EAL/D learner can then use as a framework.</p>
<p>Number and algebra Investigate the concept of a polynomial and apply the factor and remainder theorems to solve problems (ACMNA266)</p>	<p>EAL/D students in the Beginning and Emerging phases of English language learning are unlikely to have had cumulative exposure to the <i>Western Australian Curriculum and Assessment Outline</i> and so may not be familiar with the terminology or the mathematical concepts.</p>	
<p>Number and algebra Describe, interpret and sketch parabolas, hyperbolas and circles and exponential functions and their transformations (ACMNA267)</p>	<p>Students may have difficulty in expressing what they know (describe).</p>	<p>Provide support in the vocabulary and language features required for this task.</p> <p>Provide visual models of the graphs required with accompanying labels. These should be on display for students to refer to.</p>
<p>Number and algebra Apply understanding of polynomials to sketch a range of curves and describe the features of these curves from their equation (ACMNA268)</p>	<p>EAL/D students in the Beginning and Emerging phases of English language learning are unlikely to have had cumulative exposure to the <i>Western Australian Curriculum and Assessment Outline</i> and so may not be familiar with the terminology or the mathematical concepts.</p> <p>EAL/D students may understand polynomials but may still be developing the language to describe their understandings.</p>	<p>Provide both oral and written models of descriptions that EAL/D students may then use as a scaffold into their own descriptions using different variables.</p>

CONTENT DESCRIPTIONS	LANGUAGE/CULTURAL CONSIDERATIONS	TEACHING STRATEGIES
<p>Number and algebra</p> <p>Factorise monic and non-monic quadratic expressions and solve a wide range of quadratic equations derived from a variety of contexts (ACMNA269)</p>	<p>EAL/D students in the Beginning and Emerging phases of English language learning are unlikely to have had cumulative exposure to the <i>Western Australian Curriculum and Assessment Outline</i> and so may not be familiar with the terminology or the mathematical concepts.</p> <p>The contexts from which quadratic equations are derived may be unfamiliar to EAL/D students.</p>	<p>Ensure shared understandings of contexts.</p>
<p>Statistics and probability</p> <p>Investigate reports of studies in digital media and elsewhere for information on their planning, implementation and variability (ACMSP277)</p>	<p>Questioning 'authority' sources is not a skill taught in some cultures. EAL/D students may find this task confronting.</p> <p>Investigating reports in the media requires additional reading skills beyond reading statistical data. Media reports will include additional information that may highlight linguistic or cultural knowledge gaps in students.</p>	<p>Reassure students that it is necessary to question the validity of surveys and assist them in the language needed to express their findings.</p> <p>Provide support for reading media reports, unpacking the ways in which statistical data from graphs can be re-presented in prose.</p>
<p>Statistics and probability</p> <p>Calculate and interpret the mean and standard deviation of data and use these to compare data sets (ACMSP278)</p>	<p>EAL/D students in the Beginning and Emerging phases of English language learning are unlikely to have had cumulative exposure to the <i>Western Australian Curriculum and Assessment Outline</i> and so may not be familiar with the terminology or the mathematical concepts.</p>	