



Government of **Western Australia**
School Curriculum and Standards Authority



Mathematics

Teaching, learning and assessment exemplar
Year 6



Acknowledgement of Country

Kaya. The School Curriculum and Standards Authority (the Authority) acknowledges that our offices are on Whadjuk Noongar boodjar and that we deliver our services on the country of many traditional custodians and language groups throughout Western Australia. The Authority acknowledges the traditional custodians throughout Western Australia and their continuing connection to land, waters and community. We offer our respect to Elders past and present.

Background

This teaching, learning and assessment exemplar (the exemplar) has been developed by the School Curriculum and Standards Authority (the Authority) as part of the *School Education Act Employees (Teachers and Administrators) General Agreement 2017* (Clause 61.1–61.3).

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Disclaimer

Any resources, such as texts and websites, that may be referred to in this document are provided as examples of resources that teachers can use to support their learning programs. Their inclusion does not imply that they are mandated or that they are the only resources relevant to the course. Teachers must exercise their professional judgement as to the appropriateness of any resources they may wish to use.

This resource utilises electronic web-based resources, such as videos and image galleries. Teachers should be present while an electronic resource is in use and close links immediately after a resource, such as a video has played to prevent default ‘auto play’ of additional videos. Where resources are referred for home study, they should be uploaded through Connect, or an equivalent system, that filters advertising content.

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The Western Australian Curriculum

The *Western Australian Curriculum and Assessment Outline* (the *Outline* – <https://k10outline.scsa.wa.edu.au/>) sets out the mandated curriculum, guiding principles for teaching, learning and assessment, and support for teachers in their assessment and reporting of student achievement. The *Outline* recognises that all students in Australian schools, or international schools implementing the Western Australian Curriculum, are entitled to be given access to the eight learning areas described in the *Alice Springs (Mparntwe) Education Declaration*, December 2019.

The Mathematics curriculum

The mandated curriculum is presented in the year level syllabus documents.

The Mathematics curriculum delivers a sequential and age-appropriate progression of learning with the following key elements:

- a year level description that provides an overview of the context for teaching and learning in the year
- a series of content descriptions, populated through strands and sub-strands, that sets out the knowledge, understanding and skills that teachers are expected to teach and students are expected to learn
- an achievement standard that describes an expected level that the majority of students are achieving by the end of a given year of schooling. An achievement standard describes the quality of learning (e.g. the depth of conceptual understanding and the sophistication of skills) that would indicate the student is well placed to commence the learning required in the next year.

This exemplar

This Mathematics exemplar articulates the content in the *Outline* and approaches to teaching, learning and assessment reflective of the Principles of Teaching, Learning and Assessment. This exemplar presents planning for eight weeks of teaching and learning for each of the four terms, with a time allocation of five hours per week.

Catering for diversity

This exemplar provides a suggested approach for the delivery of the curriculum and reflects the rationale, aims and content structure of the learning area. When planning the learning experiences, consideration has been given to ensuring that they are inclusive and can be used in, or adapted for, individual circumstances. It is the classroom teacher who is best placed to consider and respond to (accommodate) the diversity of their students. Reflecting on the learning experiences offered in this exemplar will enable teachers to make appropriate adjustments (where applicable) to better cater for students' gender, personal interests, achievement levels, socio-economic, cultural and language backgrounds, experiences and local area contexts.

Using this exemplar

This teaching, learning and assessment exemplar provides suggestions to support the delivery of the mandated curriculum content. The exemplar provides:

- a teaching and learning sequence
- the mandated curriculum content to be taught at each point of the teaching and learning sequence, suggested resources, sample assessment tasks and marking keys
- the number of lessons to deliver the teaching and learning experiences
- learning intentions and support notes that may provide focus questions and additional information and/or examples to assist with the interpretation of curriculum content
- support notes to assist teachers to unpack the content and support teaching and learning experiences
- teaching and learning experiences that outline the structure of the lesson. These explicitly state each activity that the lesson will progress through and the key focus area for that activity.

Links to electronic resources

This sequence of lessons may utilise electronic web-based resources, such as videos and image galleries. Teachers should be present while an electronic resource is in use and close links immediately after a resource, such as a video, has played to prevent default 'auto play' of additional videos. Where resources are referred for home study, they should be uploaded through Connect, or an equivalent system, that filters advertising content.

Best practice

Teaching and learning

The teaching and learning opportunities offered in this exemplar are not exhaustive. Thus, teachers are encouraged to make professional decisions about which learning experiences, and the sequence in which they are delivered, are best suited to their classroom context, taking into account the availability of resources and student ability.

This sample may prove a useful starting point for amplifying creativity in the classroom, while presenting the embedded expectations of the Western Australian Curriculum: Mathematics.

Teachers may find opportunities to incorporate the General Capabilities and the Cross-curriculum Priorities into the teaching and learning program.

Ways of teaching – teachers can locate additional information on the Ways of teaching from the School Curriculum and Standards Authority (the Authority) website <https://k10outline.scsa.wa.edu.au/home/wa-curriculum/learning-areas/mathematics/overview/mathematics-ways-of-teaching>.

Assessing

Assessment, both formative and summative, is an integral part of teaching and learning. Assessment should arise naturally out of the learning experiences provided to students. In addition, assessment should provide regular opportunities for teachers to reflect on student achievement and progress. As part of the support it provides for teachers, this exemplar includes suggested assessment points. It is the teacher's role to consider the contexts of their classroom and students, the range of assessments required, and the sampling of content descriptions selected to allow their students the opportunity to demonstrate achievement in relation to the year level achievement standard. Teachers are best placed to make decisions about whether the suggested assessment/s are used as formative or summative assessment and/or for moderation purposes.

Ways of assessing – a range of assessment strategies that can enable teachers to understand where students are in their learning is available on the Authority website <https://k10outline.scsa.wa.edu.au/home/wa-curriculum/learning-areas/mathematics/overview/mathematics-ways-of-assessing>.

Reflecting

Reflective practice involves a cyclic process during which teachers continually review the effects of their teaching and make appropriate adjustments to their planning. The cycle involves planning, teaching, observing, reflecting and replanning.

This exemplar supports reflective practice and provides flexibility for teachers in their planning. The exemplar shows how content can be combined and revisited throughout the year. Teachers will choose to expand or contract the amount of time spent on developing the required understandings and skills according to their reflective processes and professional judgements about their students' evolving learning needs.

Year level description

In the middle to late childhood phase of schooling, students develop a sense of self, their world expands, and they begin to see themselves as members of larger communities. Learning experiences emphasise and lead to an appreciation of both the commonality and diversity of human experience and concerns.

Mathematics provides opportunities for students to develop a sound grasp of numeric conventions. Concrete materials continue to assist students to make sense of mathematical concepts as they develop the ability to think in more abstract terms.

Students engage in a range of approaches to learning through the proficiencies of understanding, fluency, problem-solving and reasoning. These reinforce the significance of working mathematically with the content and describe how the content is explored or developed.

In Year 6, students consolidate their understanding of the number system, expanding their repertoire of numbers to include integers, square, prime and composite numbers. They apply this understanding to calculate and model real-world problems efficiently and interpret and communicate findings. Students explore the Cartesian plane, describe a sequence of steps to determine the area of rectangles and volume of rectangular prisms and convert between units of measurement, connecting metric units to the decimal system. They represent probabilities numerically and conduct repeated chance experiments and simulations, comparing expected and observed frequencies. Students interpret data displays, including side-by-side column graphs, using mode, range and shape, and they describe how features of displays may influence an audience.

Achievement standard

By the end of the year:

Students demonstrate the behaviours of the proficiencies of understanding, fluency, problem-solving and reasoning in conjunction with year level content in routine situations. As part of this, they select from and use year level content along with the modelling process, in which they analyse the situation mathematically, represent the problem and interpret and communicate their findings, to solve straightforward, real-world problems in familiar contexts across all strands.

Students identify square, prime and composite numbers. They complete calculations with whole numbers using any of the four operations. Students order integers and common fractions on a number line. They add and subtract fractions with related denominators. Students add and subtract decimals to two decimal places, multiply decimals by whole numbers and multiply and divide decimals by powers of 10. They determine a familiar fraction, decimal or percentage of a whole number and make connections between them. Students describe rules that relate each element of a pattern to its position.

Students convert between units of length, mass and capacity, connecting metric units to the decimal system. They describe steps to determine the area of rectangles and the volume of rectangular prisms. Students construct three-dimensional objects, including prisms and pyramids. They determine unknown angles, explaining reasoning. Students describe translations, reflections or rotations of two-dimensional shapes and locate points in any one of the four quadrants on the Cartesian plane. They use timetables to determine duration.

Students order chance events on a scale from 0 to 1. They conduct repeated chance experiments and simulations, comparing expected and observed relative frequencies for an increasing number of trials. Students interpret a range of data displays, including using mode, range and shape, and describe how the features of displays may influence an audience. They choose the most appropriate way to collect and represent data, including in line graphs and side-by-side column graphs.

The background features a light orange horizontal bar at the bottom. Above it, there are several orange circles of varying sizes. On the left, three thin-outlined circles are arranged in a cluster. On the right, a large solid orange circle is partially cut off by the edge, with a smaller solid orange circle overlapping its top-left. Above these, several more thin-outlined circles of different sizes are scattered.

Term 1

Weeks 1–8

Term 1 Overview – Learning intentions

	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8
Learning intentions	NA UN UEI To read, write and order positive and negative integers on a number line in everyday situations	NA UN To connect common percentages with fractions and decimals	NA CN To use estimating and rounding to make reasonable judgements To use efficient strategies to solve addition problems	NA CN To use estimating and rounding to make reasonable judgements To use efficient strategies to solve subtraction problems	NA CN To use efficient strategies to add and subtract decimal numbers up to two decimal places	NA CN MN To apply efficient addition and subtraction strategies to solve problems with whole numbers and decimals	NA CN MG 2DSS To establish the relationships between metric units of length and the decimal place value system	MG NSM MMG To use timetables and itineraries to calculate the duration of journeys and activities

NA Number and algebra
UN Understanding number
CN Calculating with number
2DSS Two-dimensional space and structures
MMG Modelling with measurement and geometry

MG Measurement and geometry
UEI Understanding equalities and inequalities
FM Financial mathematics
3DSS Three-dimensional space and structures
P Probability

PS Probability and statistics
PR Patterns and relationships
MN Modelling with number
NSM Non-spatial measurement
S Statistics

Western Australian Curriculum content	Term 1 Daily practice activities
<p>Number and algebra</p> <p>Calculating with number Choose and use flexible and efficient strategies to calculate with whole numbers, involving any of the four operations, and explore the use of the order of operations</p> <p>Use estimation and rounding to make reasonable evaluations and justify results</p>	<p>Weeks 1–4</p> <p>Facilitate learning and sharing of flexible mental calculation strategies, encouraging the use of estimating and rounding to make reasonable evaluations. Ensure students have frequent opportunities to:</p> <ul style="list-style-type: none"> • add and subtract using strategies based on partitioning and rearranging, e.g. $285 + 78 = 250 + 30 + 70 + 8 + 5 = 350 + 13$ and $465 - 97 = 465 - 100 + 3$ • multiply and divide using strategies, such as mental multiplication using known multiples, doubling and halving, or partitioning to multiply and divide, e.g. $35 \times 18 = 7 \times 5 \times 2 \times 9 = 7 \times 10 \times 9$ and $216 \div 24 = 108 \div 12 = 54 \div 6 = 27 \div 3$.
<p>Number and algebra</p> <p>Understanding number Investigate the use of positive and negative integers to represent everyday situations. Read, write and order integers on a number line</p> <p>Connect commonly used percentages, including 10%, 25% and 50%, to fractions and decimals, including on a number line</p> <p>Calculating with number Choose and use flexible and efficient strategies to calculate with whole numbers, involving any of the four operations, and explore the use of the order of operations</p>	<p>Weeks 5–8</p> <p>Provide authentic word problems involving addition and subtraction that require the use of part-part-whole models and number sentences to solve.</p> <p>Provide students with positive and negative integers to order or position on a number line.</p> <p>Play games with students using cards containing fractions, decimals and percentages. Games could include memory match or sorting activities that provide opportunities for students to practise connecting different representations of the same values.</p>

Term 1 Week 1

Western Australian Curriculum content	Teaching and learning intentions	Learning experiences
<p>Number and algebra</p> <p>Understanding number Investigate the use of positive and negative integers to represent everyday situations. Read, write and order integers on a number line</p> <p>Understanding equalities and inequalities Complete, check and construct statements of equality and inequality involving the four operations, including the use of brackets and order of operations, and explain reasoning</p>	<p>Learning intention To read, write and order positive and negative integers on a number line in everyday situations</p> <p>Focus questions</p> <ul style="list-style-type: none"> • Why is zero needed on the number line? • How do you know the numbers on a number line are in the correct order? • What direction will you need to go on the number line if the temperature is increasing? • What does the term 'minus' mean? <p>Support notes Explain negative numbers as indicating increments, but in the opposite direction to positive numbers, with zero still indicating the starting point. Mention that zero is neither a positive nor a negative integer.</p> <p>Explain to students that a minus symbol is used to show a negative number and to indicate a subtraction operation.</p> <p>Suggested assessment point Learning experience 3 could be used as formative assessment of students' understanding of ordering and representing positive and negative integers on a number line.</p>	<p>Learning experience 1</p> <ul style="list-style-type: none"> • Administer the Thermometer diagnostic task (Appendix A) to determine students' knowledge of negative numbers. • Ask students, 'Where might negative numbers be used in real-world situations?' In pairs, students discuss situations where numbers less than zero are needed. Review ideas as a class. • Discuss the term 'integer'. • Model how to draw a number line from minus 10 to 10 and discuss the position of the integers. • Compare different integers from the number line using greater than and less than symbols. • Provide small groups of students with cards displaying sets of integers on them. Some of the cards should have numbers ordered from smallest to largest and the rest of the cards should show an incorrect order of numbers. The students will work together to sort the cards into those that are correct and those that are incorrect. <p>Learning experience 2</p> <ul style="list-style-type: none"> • Ask students to construct a number line to represent temperatures from negative 10 °C to 10 °C. • Model how to use the number line to solve problems involving rises and falls in temperature, e.g. If it was negative nine degrees at midnight, and then the temperature rose by one degree each hour, what is the temperature at midday?

Western Australian Curriculum content	Teaching and learning intentions	Learning experiences
		<p>Students then write equations to represent the problem/s that they solved, e.g. $-9^{\circ}\text{C} + 12^{\circ}\text{C} = 3^{\circ}\text{C}$.</p> <ul style="list-style-type: none"> • Provide students with problems to solve using their number lines. Ask them to write the corresponding equations. <p>Learning experience 3</p> <ul style="list-style-type: none"> • Extend the previous learning experience by providing students with cards covering a range of whole number average temperatures from around the world. • Ask students how they know which country has the coldest temperature. • Ask students to draw a number line to represent the order of the temperatures. • Students write word problems that can be solved using the information represented on the number line. They then swap with a classmate to solve. <p>Learning experience 4</p> <ul style="list-style-type: none"> • Discuss with students the use of debit and credit cards and the meaning of positive and negative amounts of money. Ask the following questions: <ul style="list-style-type: none"> ▪ What does it mean when your credit card balance shows a negative amount? ▪ What steps can you take to change a negative credit card balance to a positive one? ▪ What would happen to a negative credit card balance if more money were spent from that account?

Western Australian Curriculum content	Teaching and learning intentions	Learning experiences
		<ul style="list-style-type: none">• Ask students to create a number line that ranges from negative 50 to 50 on 2 mm grid paper, labelling every tenth gridline with the decade numbers.• Provide authentic credit card problems that involve moving between positive and negative amounts of money. For example, 'Mina's credit card showed she owed \$25 at the end of the month. She paid \$40 into her account. What will her credit card account show after her payment?'• Students use their number lines to show jumps and make calculations, then they write an equation to represent the problem.

Term 1 Week 2

Western Australian Curriculum content	Teaching and learning intentions	Learning experiences
<p>Number and algebra</p> <p>Understanding number</p> <p>Connect commonly used percentages, including 10%, 25% and 50%, to fractions and decimals, including on a number line</p>	<p>Learning intention</p> <p>To connect common percentages with fractions and decimals</p> <p>Focus questions</p> <ul style="list-style-type: none"> What is the connection between one-half and 0.5? How do you think 50% and the fraction one-half are linked? What does 'percent' mean? How do you know that 25% and $\frac{1}{4}$ are equivalent? Does $\frac{1}{5}$ off a price and $\frac{1}{5}$ less mean the same thing? <p>Support notes</p> <p>Learning experience 1 enables students to share their everyday knowledge of the connections between simple fractions, percentages and decimals. This can provide a starting point for the deeper-level explicit teaching that will follow.</p>	<p>Learning experience 1</p> <ul style="list-style-type: none"> As a diagnostic task, provide real-world problems to discover students' current ideas about links between fractions, percentages and decimals. <p>Students discuss these problems in small groups and then share what they know with the class.</p> <p>An example of a problem could be the following. Three signs were seen in a shop during a sale. The signs said:</p> <ul style="list-style-type: none"> 50% saving on \$30 save 0.5 of \$30 pay half the \$30 price. <p>Which do you think would be the best deal? Explain your thinking.</p> <p>Learning experience 2</p> <ul style="list-style-type: none"> Review the meaning of the percentage symbol. Use base-ten blocks to model the meaning of 100%, 50%, 25% and 10%, and relate these to the corresponding fractions and decimals. Depending on previous understanding, teachers may need to model $25\% = \frac{25}{100} = 0.25$, then simplify to get the fraction $\frac{1}{4}$, showing that $4 \times \frac{1}{4}$ and 4×0.25 is equal to one whole. Ask students how they could use their knowledge of 25% as a fraction and decimal to work out 75% as a fraction and decimal. Students draw and label representations of 100%, 50%, 25% and 10% on grid paper as a reference.

Western Australian Curriculum content	Teaching and learning intentions	Learning experiences
		<ul style="list-style-type: none"> • Invite students to use this knowledge and the base-ten blocks to create other percentages (e.g. 75%, 20%) and identify the equivalent decimals and fractions. <p>Learning experience 3</p> <ul style="list-style-type: none"> • Consolidate understanding of the previous learning experience using money, where \$1 is equal to 100%. • Ask students how they could show different parts of a dollar using fractions, decimals and percentages. • Provide pairs of students with money challenges that require them to find different percentages, fractions or decimals of \$1. For example, 20% of \$1, 0.75 of \$1 or $\frac{1}{10}$ of \$1. • Students record the connections between common percentages, fractions and decimals in a table. <p>Learning experience 4</p> <ul style="list-style-type: none"> • Provide students with percentage discount adverts and discuss what the matching fraction and decimal discount would be, e.g. 50% off = $\frac{1}{2}$ price = save 0.5. • Provide students with one advert containing an error. For example, 10% off = pay $\frac{1}{5}$ less = save 0.1. Ask students to find and justify the error. • In pairs, students each write an incorrect statement on a piece of paper. Students swap statements to record the error and what the correction would be. The pairs of students then discuss their solutions, providing feedback on if their partner is correct or not.

Term 1 Week 3

Western Australian Curriculum content	Teaching and learning intentions	Learning experiences
<p>Number and algebra</p> <p>Calculating with number Choose and use flexible and efficient strategies to calculate with whole numbers, involving any of the four operations, and explore the use of the order of operations</p> <p>Use estimation and rounding to make reasonable evaluations and justify results</p>	<p>Learning intention To use estimating and rounding to make reasonable judgements</p> <p>To use efficient strategies to solve addition problems</p> <p>Focus questions</p> <ul style="list-style-type: none"> • Can two strategies be equally efficient? How? • How can estimating help you check if your addition answers are reasonable? • How does rounding numbers before adding make calculations simpler and quicker to complete? <p>Support notes Strategies are efficient when they can be used to solve an equation with the least amount of effort and time while producing an accurate result. Students need to be familiar with a range of strategies so they can choose the most efficient.</p> <p>An example of a think board can be found in Appendix A.</p> <p>When writing addition questions for Learning experience 3, teachers should select questions that will allow for a range of strategies to be applied.</p>	<p>Learning experiences 1 and 2</p> <ul style="list-style-type: none"> • Elicit students' knowledge of addition strategies by providing a question such as $2998 + 4202$ and establishing different ways it could be solved. Ask students why they chose their strategy to solve. • Where necessary, model the different strategies suggested, and discuss which would be the most efficient and why. Add to an anchor chart and leave on display for students to use as a reference. • Provide the class with a range of addition questions using three-, four- or five-digit numbers. • In pairs, ask students to group the questions by the most efficient strategy to solve. Compare and discuss students' responses as a class. • Review strategies that students did not choose and establish reasons why. Ask students how they decided on how to group the questions together. Discuss if there were any questions that could belong to more than one group, and why that might be the case. • Students return to working in pairs to apply the strategies and solve the questions. <p>Learning experience 3</p> <ul style="list-style-type: none"> • Discuss the usefulness of using estimating or rounding before calculating. Model how to estimate and round answers for addition questions. • Write different addition questions on large sheets of paper and place these sheets on different tables around the

Western Australian Curriculum content	Teaching and learning intentions	Learning experiences
	<p>Suggested assessment point</p> <p>Learning experience 4 can be used as a formative assessment of students' understanding and application of addition strategies.</p>	<p>classroom. In small groups, students complete two tasks for each question. The two tasks are:</p> <ul style="list-style-type: none"> ▪ estimate or round – show how they would use estimating or rounding to answer the question ▪ solve – show the most efficient strategy to solve the question. <ul style="list-style-type: none"> • Students rotate through all the questions, recording an alternate estimate or rounding option, and a different strategy to answer the question to the ones already used. On the last rotation, the group discusses and circles the best estimate and the strategy which they feel is the most efficient for that question. Students share their chosen strategy to the class, explaining their reasoning. <p>Learning experience 4</p> <ul style="list-style-type: none"> • Review the importance of estimating and/or rounding prior to calculating. • Provide students with three addition questions using three- or four-digit numbers and three copies of a think board. Students complete the questions, recording different strategies for each.

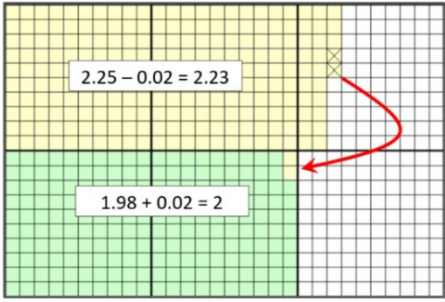
Term 1 Week 4

Western Australian Curriculum content	Teaching and learning intentions	Learning experiences
<p>Number and algebra</p> <p>Calculating with number Choose and use flexible and efficient strategies to calculate with whole numbers, involving any of the four operations, and explore the use of the order of operations</p> <p>Use estimation and rounding to make reasonable evaluations and justify results</p>	<p>Learning intention To use estimating and rounding to make reasonable judgements</p> <p>To use efficient strategies to solve subtraction problems</p> <p>Focus questions</p> <ul style="list-style-type: none"> • Can two strategies be equally efficient? How? • How can estimating help you check if your subtraction answers are reasonable? • How does rounding numbers before subtracting make calculations simpler and quicker to complete? <p>Support notes Similar activity structures have been used across addition and subtraction, to reduce cognitive load, allowing students to focus on applying effective mathematical strategies.</p> <p>If nine-sided dice are not available, use an online interactive option.</p> <p>Suggested assessment point Learning experience 4 can be used as a formative assessment of students' understanding and application of subtraction strategies.</p>	<p>Learning experiences 1 and 2</p> <ul style="list-style-type: none"> • Elicit students' knowledge of subtraction strategies by providing a question such as $3456 - 1998$ and establishing different ways that it could be solved. Ask students why they chose their strategy to solve. • Where necessary, model the different strategies suggested, and discuss which would be the most efficient and why. Add to an anchor chart and leave on display for students to use as a reference. • Provide the class with a range of subtraction questions using three-, four- or five-digit numbers. • In pairs, ask students to group the questions by the most efficient strategy to solve. Compare and discuss students' responses as a class. • Ask students how they decided on how to group the questions together. Discuss if there were any questions that could belong to more than one group, and why that might be the case. • Students return to working in pairs to apply the strategies and solve the questions. <p>Learning experience 3</p> <ul style="list-style-type: none"> • Review the different subtraction strategies identified in the previous learning experience. Model any subtraction strategies that students did not suggest. • Ask pairs of students to record on mini whiteboards subtraction questions that could be answered by applying each of the strategies.

Western Australian Curriculum content	Teaching and learning intentions	Learning experiences
		<p>Students share questions as a class and discuss reasons for using each strategy.</p> <ul style="list-style-type: none"> • Provide pairs of students with a large sheet of paper and a starting number, such as 8000. Students roll a nine-sided die (see support notes) three times to create a three-digit number. They then subtract their random number from the starting number using the most efficient strategy. • Students continue to roll new numbers and subtract from the answer to their previous subtraction until the resulting answer would go below zero. • Pairs review each other's work and provide feedback. <p>Learning experience 4</p> <ul style="list-style-type: none"> • Review the importance of estimating and/or rounding prior to calculating. • Provide students with three subtraction questions using three- or four-digit numbers and three copies of a think board. Students complete the questions, recording different strategies for each. • Ask students to discuss the strategies used and which were the most efficient.

Term 1 Week 5

Western Australian Curriculum content	Teaching and learning intentions	Learning experiences
<p>Number and algebra</p> <p>Calculating with number Add and subtract decimals to two decimal places, using flexible and efficient strategies</p> <p>Use estimation and rounding to make reasonable evaluations and justify results</p>	<p>Learning intentions</p> <p>To use efficient strategies to add and subtract decimal numbers up to two decimal places</p> <p>Focus questions</p> <ul style="list-style-type: none"> • How does rounding support calculating? • How is expanding a decimal number similar to expanding a whole number? How is it different? • Why does changing the order in which you add numbers make no difference to the result? • When would levelling up be an efficient strategy for adding decimals? • How does understanding place value help you when working with decimal numbers? • When would using written algorithms be efficient for adding or subtracting decimals? <p>Support notes To become fully efficient with calculations, students need to recognise and represent standard and non-standard place value partitions of decimal numbers. For example:</p> $ \begin{aligned} 4.85 + 5.76 &= 4 + 0.8 + 0.05 + 5 + 0.7 + 0.06 \\ &= 4 + 5 + 0.8 + 0.7 + 0.05 + 0.06 \\ &= 9 + 1.5 + 0.11 \\ &= 10.5 + 0.11 \\ &= 10.61 \end{aligned} $	<p>Learning experience 1</p> <ul style="list-style-type: none"> • As a diagnostic question, ask students to write down 15 numbers between 4.01 and 4.1, then order the numbers from smallest to largest. • Analyse responses to assess the flexibility of student knowledge of decimal representations and their understanding of the relationship between the first two decimal places. • Decide if students are ready to work with numbers alone or need to use decimal grid paper to provide a visual model when adding decimal numbers. • Model expanding decimal numbers into place value components, then assist students to practise this skill. • Demonstrate how place value partitioning can be used to add decimal numbers. For example, $12.37 + 8.12$ can be partitioned into $12 + 0.3 + 0.07$ plus $8 + 0.1 + 0.02$. • Provide a range of decimal addition questions for students to answer by rounding to the nearest whole number and then using partitioning to calculate. <p>Learning experience 2</p> <ul style="list-style-type: none"> • Use grid paper to model how to use levelling as an addition strategy (see the example in the Support notes). • Review the types of numbers where levelling is the most efficient strategy.

Western Australian Curriculum content	Teaching and learning intentions	Learning experiences
	<p>An example of levelling can be seen below.</p> 	<ul style="list-style-type: none"> Provide a range of addition questions and grid paper for students to explore using levelling. <p>Learning experience 3</p> <ul style="list-style-type: none"> Review the use of estimating as a strategy to support calculating. Show students a decimal subtraction question and discuss strategies that could be applied to solve it. For example, $2.56 - 0.89$. Ask students how estimating can help them check if their decimal answer is reasonable. Ask them to consider if changing the order in which they subtract numbers would make a difference to the result. Have students explain their responses. <p>Demonstrate that 0.89 is close to 1 and discuss how this could make the question easier to solve. If required, use a number line or grid paper to show adding 0.11 to create 1.</p> <p>Discuss why 2.56 would also need to increase by 0.11, making the question $2.67 - 1$.</p> <ul style="list-style-type: none"> Provide subtraction questions for students to practise this strategy with a partner. <p>Learning experience 4</p> <ul style="list-style-type: none"> Review and model using written algorithms for addition and subtraction of decimals with two decimal places. Discuss when written algorithms should be used. Provide addition and subtraction decimal questions for students to answer using written algorithms.

Term 1 Week 6

Western Australian Curriculum content	Teaching and learning intentions	Learning experiences
<p>Number and algebra</p> <p>Calculating with number Choose and use flexible and efficient strategies to calculate with whole numbers, involving any of the four operations, and explore the use of the order of operations</p> <p>Add and subtract decimals to two decimal places, using flexible and efficient strategies</p> <p>Use estimation and rounding to make reasonable evaluations and justify results</p> <p>Modelling with number In real-world situations involving whole numbers, order of operations and fractions with the same denominator, use the following process</p> <ol style="list-style-type: none"> analyse the situation and identify relevant information mathematically represent the situation, including using equations to reach a solution interpret and communicate findings in the context, exploring and justifying decisions 	<p>Learning intention To apply efficient addition and subtraction strategies to solve problems with whole numbers and decimals</p> <p>Focus questions</p> <ul style="list-style-type: none"> How can we represent the problem in a part-part-whole model? Which operation is needed to solve the problem and how do you know? What strategies did you apply when solving the problem? <p>Support notes This learning sequence is designed to focus on additive problems; however, simple multiplication strategies are required for Learning experiences 3 and 4, which are reflective of understanding from Year 5.</p> <p>Examples of word problem types can be found in Appendix A.</p>	<p>Learning experiences 1 and 2</p> <ul style="list-style-type: none"> Begin by reviewing combine problems by adding two or more numbers (see Appendix A for information on types of word problems). Provide students with a range of additive problems to interpret by representing as a part-part-whole model, writing an equation and applying an appropriate mental or written strategy to solve. Include problems with whole numbers and decimal numbers in the context of money and measurement. Students discuss estimations before calculating. Once students have used the part-part-whole model, introduce combine join and combine separate problems together, so students can practise identifying whether addition or subtraction is required to solve the problem. <p>Learning experiences 3 and 4</p> <ul style="list-style-type: none"> Provide students with a real-world situation and model the process required to solve it. <p>For example: The students in Year 6 are going on an excursion to a science museum. There are 29 students in Class 6, 28 students in Class 7 and 30 students in Class 8. Nine adults will also be attending. Tickets cost \$6 per person, and the bus costs \$5 per person. If the school is contributing \$400 towards the excursion, how much money will need to be collected to pay for the excursion?</p>

Western Australian Curriculum content	Teaching and learning intentions	Learning experiences
		<ul style="list-style-type: none"> • Ask students to: <ul style="list-style-type: none"> ▪ consider what information in the question is relevant ▪ consider how they could represent the problem in an equation ▪ consider efficient strategies before solving the problem ▪ consider how they knew which operations were required to solve the problem ▪ interpret and communicate their findings in the context of the problem, such as writing a sentence to explain how the solution relates to how much money is needed to pay for the excursion. • Provide students with similar problems where they can apply addition and subtraction strategies, as well as multiplication strategies appropriate to understanding from Year 5 using the modelling process.

Term 1 Week 7

Western Australian Curriculum content	Teaching and learning intentions	Learning experiences
<p>Number and algebra</p> <p>Calculating with number Multiply decimals by whole numbers and multiply and divide decimals by powers of 10, using flexible and efficient strategies</p> <p>Measurement and geometry</p> <p>Two-dimensional space and structures Convert between units of length by connecting metric units to the decimal system and extend to units of mass and capacity</p>	<p>Learning intention To establish the relationships between metric units of length and the decimal place value system</p> <p>Focus questions</p> <ul style="list-style-type: none"> • What are the main metric units for length? • What mathematical process is needed to convert between different units of length? • How does understanding prefixes help you convert between units? • How does knowing that each place is 10 times the value of the previous place help you convert between metric units? • Explain why the order of digits in a number does not change when multiplying or dividing by powers of 10. • How can estimating help you check if your conversion makes sense (is reasonable)? 	<p>Learning experience 1</p> <ul style="list-style-type: none"> • Provide sets of cards showing a range of metric units and non-metric units for length. <p>In small groups, students sort the cards into metric and non-metric units, using a dictionary or the internet to assist them.</p> <ul style="list-style-type: none"> • Ask students to share what they know about the metric system and clarify any misconceptions. • Provide groups of students with rulers and metre sticks to use as a visual support and ask groups to describe the mathematical process needed to convert between metric units of length. Students record ideas on whiteboards and then review as a class. <p>Learning experience 2</p> <ul style="list-style-type: none"> • List the metric units of length then ask students to sort the units in order of size from smallest to largest. Identify the prefixes in the units and their meanings. • Record the units in a measurement place value table that highlights the relationship and model how to use the table. • Students create their own measurement place value table to reference in later lessons. Ask students how a place value table can help them convert between metric units of length. <p>Learning experience 3</p> <ul style="list-style-type: none"> • As a class, review the naming conventions for metric units and the connections to the decimal place value system. • Create opportunities for students to use this knowledge by providing challenges, such as asking them to measure the

Western Australian Curriculum content	Teaching and learning intentions	Learning experiences
		<p>length of a small object in centimetres and convert the length to metres. Students create a table that lists the conversions they have made when measuring the objects in different units.</p> <ul style="list-style-type: none"> Ask students to explain and justify why multiplying or dividing by 10, 100 or 1000 must result in the correct equivalent measurement. <p>Learning experience 4</p> <ul style="list-style-type: none"> Discuss when converting between units of length would be used in real-world situations, e.g. sports events, room or furniture measurements. Ask students why it is important to understand metric conversions in real-world situations. Provide students with a range of examples to practise converting between units of length. Model how one unit (m) can be converted to all other metric units (km, cm, mm), using a chart as a scaffold, e.g. <ul style="list-style-type: none"> $3 \text{ metres} \div 1000 = 0.003 \text{ kilometres}$ $3 \text{ metres} \times 100 = 300 \text{ centimetres}$ $3 \text{ metres} \times 1000 = 3000 \text{ millimetres}$. Provide students with a number of cards that each have a different measurement on them. Place a number of length measurements on cards. Ask students to select four cards and record how each of the measurements can be converted to multiple smaller and larger units.

Term 1 Week 8

Western Australian Curriculum content	Teaching and learning intentions	Learning experiences
<p>Measurement and geometry</p> <p>Non-spatial measurement Use timetables and itineraries in 12- and 24-hour time systems to determine the duration of events and journeys</p> <p>Modelling with measurement and geometry In real-world situations involving transformation of two-dimensional shapes, rectangular prisms, pyramids, Cartesian planes, measuring and converting metric units for length, mass and capacity, determining volume and area in metric units or determining the duration of events and journeys, use the following process</p> <ol style="list-style-type: none"> analyse the situation and identify relevant information mathematically represent the situation to reach a solution interpret and communicate findings in the context, exploring and justifying decisions 	<p>Learning intention To use timetables and itineraries to calculate the duration of journeys and activities</p> <p>Focus questions</p> <ul style="list-style-type: none"> What are some key features that all timetables display? How do you convert travel time from hours and minutes to minutes? How does a number line help you to calculate duration of time? <p>Support notes Useful online searches for timetables could include:</p> <ul style="list-style-type: none"> 'Transperth timetables' 'Transwa' 'Greyhound Australia'. <p>Teachers may set boundaries around the task in Learning experience 2 by setting a different start time each day.</p> <p>Teachers could alter Learning experience 3 to plan an itinerary for the school camp or an excursion linked to an area of the curriculum being studied.</p> <p>Suggested assessment point Teachers can observe students' ability to create itineraries and calculate the duration of activities when constructing the daytrips to Rottnest Island.</p>	<p>Learning experience 1</p> <ul style="list-style-type: none"> Provide a range of transport timetables in both 12- and 24-hour time systems or allow students to search the internet to find their own examples. Ask students to describe and compare the way the timetables are structured and find common features. Review strategies for converting between 12- and 24-hour time systems with students. Ask students to explain a strategy for changing a 24-hour time to a 12-hour time, or vice versa. Discuss strategies for calculating elapsed time, including the use of a number line. Provide students with access to an online timetable, e.g. Transwa – Transwa Train Timetables https://www.transwa.wa.gov.au/tickets-times/train-timetables. <p>Students calculate the duration of time between different destinations.</p> <p>Learning experience 2</p> <ul style="list-style-type: none"> Provide students with a simple itinerary of towns to visit in Western Australia by car; for example: <ul style="list-style-type: none"> Day 1: Perth to Busselton Day 2: Busselton to Margaret River Day 3: Margaret River to Denmark Day 4: Denmark to Albany Day 5: Albany to Esperance Day 6: Esperance to Hyden Day 7: Hyden to Perth.

Western Australian Curriculum content	Teaching and learning intentions	Learning experiences
		<ul style="list-style-type: none"> Students plan the trip, making sure to leave each town at 9.30 am and to add arrival times to the itinerary in 12- and 24-hour time. They should also include the travel time between each destination in hours and minutes, and just minutes. Students use online maps to find the distance and time it takes to travel between each place by car. Ask students to explain what strategies they used to calculate the duration of time. <p>Learning experiences 3 and 4</p> <ul style="list-style-type: none"> As a class, brainstorm the kinds of information needed in an itinerary and where information can be found. Ask students the following questions: <ul style="list-style-type: none"> How will you set out your itinerary? What time system will you use? What information will you need to find out before you can produce an itinerary? How will you determine the start and end time? How do you know you have allowed enough time for travel, changeover of activities etc.? Students work in pairs to plan an itinerary for a daytrip to Rottnest Island, starting and ending in Fremantle. Explain that the itinerary should include ferry times, two activities with start and end times, and scheduled breaks for recess and lunch, with calculated durations for each. Students share their itineraries with the class. It is possible to extend the task by asking students to record the cost for an adult and a child.

The image features an abstract design with several orange circles of varying sizes. Some circles are solid, while others are outlines. A large solid orange circle is positioned on the right side, partially overlapping a horizontal orange bar at the bottom. To its left, a smaller solid orange circle is also visible. In the upper left, there are several overlapping circles, some as outlines and some as solid shapes. The bottom of the image is a solid horizontal orange bar.

Term 2

Weeks 1–8

Term 2 Overview – Learning intentions

	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8
Learning intention	NA PR To create patterns using numbers and concrete materials, and determine rules for creating the patterns	NA UN To identify and represent square, prime and composite numbers using physical materials, and create a table to record findings	NA CN To use estimating and rounding to make reasonable judgements To choose and use efficient strategies for multiplication	NA CN MN To choose and use efficient strategies for division and apply efficient multiplication and division strategies to solve real-world word problems	NA UN CN To explore what happens when a number is repeatedly multiplied and divided by 10 To use mental and written strategies to multiply decimals by one- and two-digit numbers	MG 2DSS To investigate the area of rectangles by manipulating dimensions	MG 3DSS To visualise, construct and sketch three-dimensional objects	PS S To compare and interpret a range of real-life numerical data and describe the mode, range and shape of the graph

NA Number and algebra
UN Understanding number
CN Calculating with number
2DSS Two-dimensional space and structures
MMG Modelling with measurement and geometry

MG Measurement and geometry
UEI Understanding equalities and inequalities
FM Financial mathematics
3DSS Three-dimensional space and structures
P Probability

PS Probability and statistics
PR Patterns and relationships
MN Modelling with number
NSM Non-spatial measurement
S Statistics

Western Australian Curriculum content	Term 2 Daily practice activities
<p>Number and algebra</p> <p>Understanding number Represent and explain the multiplicative place value relationship between places in any number, including decimals</p> <p>Calculating with number Add and subtract decimals to two decimal places, using flexible and efficient strategies</p> <p>Multiply decimals by whole numbers and multiply and divide decimals by powers of 10, using flexible and efficient strategies</p>	<p>Weeks 1–4</p> <p>Facilitate learning and practising of flexible mental calculation strategies involving decimal numbers, linking them to whole-number calculation strategies. Ensure students have frequent opportunities to:</p> <ul style="list-style-type: none"> • add and subtract based on place value and non-standard partitioning/rearranging • multiply and divide based on multiplicative relationships, factors and multiples • round and estimate probable results.
<p>Number and algebra</p> <p>Understanding number Connect commonly used percentages, including 10%, 25% and 50%, to fractions and decimals, including on a number line</p> <p>Calculating with number Add and subtract fractions with related denominators using flexible and efficient strategies based on knowledge of equivalence</p> <p>Determine a familiar fraction, decimal or percentage of a whole number</p>	<p>Weeks 5–8</p> <p>Facilitate practice of adding and subtracting fractions in authentic contexts. One way to do this is through using the ‘How did you do it?’ strategy, where students discuss strategies used to solve problems. Provide one or two examples of a fraction addition or subtraction problem involving everyday situations and using related denominators among halves, quarters and eighths; thirds, sixths and twelfths; halves, fifths and tenths.</p> <p>Facilitate practice of finding fractions and percentages of quantities and relating to decimals as fractions.</p> <p>Facilitate opportunities for students to link fractions, percentages and decimals using knowledge of equivalent fractions, e.g. $40\% = 0.4 = \frac{40}{100} = \frac{4}{10} = \frac{2}{5}$. Ensure understanding that finding a ‘fraction of’ a whole is interchangeable with finding a decimal or percentage of a whole. Focus students on using representations that lead to the simplest calculation strategy.</p>

Term 2 Week 1

Western Australian Curriculum content	Teaching and learning intentions	Learning experiences
<p>Number and algebra</p> <p>Patterns and relationships</p> <p>Create and represent increasing or decreasing patterns using concrete materials and numbers. Use words to generalise rules that relate each element of a pattern to its position</p>	<p>Learning intention</p> <p>To create patterns using numbers and concrete materials, and determine rules for creating the patterns</p> <p>Focus questions</p> <ul style="list-style-type: none"> • How does thinking about how many more are added on for each repeat unit help you work out how many there are altogether? • How does the number of repeat units you want to make come into your calculations? • What is the first thing you look for when trying to figure out the rule of a number pattern? • How can two different rules produce the same pattern? <p>Support notes</p> <p>If students find whole number patterns too simple to create and determine the rules for, have them write rules and number patterns using decimals and/or fractions.</p> <p>Students should have experience exploring additive patterns, so once those are reviewed, they can move on to multiplicative patterns. Exploration of patterns and associated rules provide opportunities to develop a repertoire of strategies to find the rule of a given pattern.</p> <p>Students can research matchstick patterns to help find ideas for creating patterns from concrete materials.</p>	<p>Learning experience 1</p> <ul style="list-style-type: none"> • Show students an additive pattern made from matchsticks by positioning the matchsticks in shapes such as triangles, squares or pentagons. • In small groups, students make the next two repeat shapes (units) in the pattern and discuss the number of matchsticks used. • As a class, discuss the pattern created and the number of matchsticks used. Ask for predictions about the number of matchsticks used in the tenth repeating shape (unit). Ask students to find a rule that would tell them the number of matchsticks needed for any number of repeat units. • Model how to record pattern positions and the number of matchsticks in a table, to support finding the rule relating to the position of repeat unit and number of matchsticks. • Provide pairs of students with matchstick patterns. Students work together to tabulate the information and use this to try and establish a rule that could predict how many matchsticks they will need to make a given number of shapes (units), e.g. 20 shapes (units) using 100 matchsticks. <p>Learning experience 2</p> <ul style="list-style-type: none"> • Show students a pattern made from concrete materials but with two elements, e.g. blocks and counters

Western Australian Curriculum content	Teaching and learning intentions	Learning experiences
	<p>Suggested assessment point</p> <p>Learning experience 4 provides opportunity to assess students' developing ability to analyse and interpret number patterns, and to formulate the rules that define them.</p>	<p>representing tables and chairs. Increase the pattern by adding another set of table and chairs each time.</p> <ul style="list-style-type: none"> As a class, discuss the pattern created by the two elements. Tabulate the information and look for the rule that relate to the position number. Students create their own patterns from concrete materials, ensuring that they follow a rule relating to the position number. <p>Learning experience 3</p> <ul style="list-style-type: none"> Ask students to devise a rule for an increasing or decreasing number pattern and record the first five numbers in the pattern. Students swap their pattern with a partner and try to find the rule and continue the pattern. Review patterns and compare the rules. As a class, look at and discuss any patterns where rules are different but result in the same pattern, e.g. <ul style="list-style-type: none"> start at four and add one, then double the number start at four and times by two, then add two. Provide students with number patterns to analyse, continue and attempt to find the rule for. Provide the first six numbers in each pattern and include patterns with rules that have two parts. <p>Learning experience 4</p> <ul style="list-style-type: none"> Provide students with a number pattern that has a currently unknown rule that relates to the position number, such as number of popsticks = $4 + (\text{position number} - 1) \times 3$.

Western Australian Curriculum content	Teaching and learning intentions	Learning experiences
		<ul style="list-style-type: none">• Review using a table to record the pattern and find relationships in the order and pattern of numbers.• Students attempt to find the rule that uses the position number, testing out their ideas as they go. Students establish the rule and use this to predict what the 'hundredth' number in the pattern would be.• Provide students with more patterns to repeat this process.

Term 2 Week 2

Western Australian Curriculum content	Teaching and learning intentions	Learning experiences															
<p>Number and algebra</p> <p>Understanding number</p> <p>Explore, identify and represent square, prime and composite numbers in arrays and explain reasoning</p>	<p>Learning intention</p> <p>To identify and represent square, prime and composite numbers using physical materials, and create a table to record findings</p> <p>Focus questions</p> <ul style="list-style-type: none">• How do you know which are factors and which are multiples?• How do you know whether your number can be made into a square or not just by looking at the factors in your equation?• Why is there only one arrangement for the square pattern?• How can you determine how many counters are needed for larger ‘squares’? <p>Support notes</p> <p>Provide students with supports, such as a multiplication chart with either the square numbers identified or where students can shade the square numbers. Link this to the concrete representation of square numbers explored in Learning experience 3 with counters.</p>	<p>Learning experience 1</p> <ul style="list-style-type: none">• Review the meaning of ‘factors’ and ‘multiples’.• Show students a multiplication number sentence and review how to represent it as an array. Identify the factors and the multiple, explaining the relationship between the numbers.• Provide students with 5 mm grid paper and multiplication number sentences. Students draw arrays and label the factors and multiples by labelling the rows and columns and writing the multiple in the centre of the array. Ask students how the rows, columns and total number of squares relate to the number sentences. <p>Learning experience 2</p> <ul style="list-style-type: none">• Provide students with examples and non-examples of prime, composite and square numbers. Encourage students to use reasoning to derive the properties of each of these number types, rather than be given definitions. <table><tr><td>Prime numbers</td><td>3✓</td><td>17✓</td><td>8✗</td><td>100✗</td></tr><tr><td>Composite numbers</td><td>15✓</td><td>42✓</td><td>7✗</td><td>23✗</td></tr><tr><td>Square numbers</td><td>4✓</td><td>25✓</td><td>10✗</td><td>29✗</td></tr></table> <ul style="list-style-type: none">• In groups, students create arrays, using counters, for the numbers in the table. They photograph each attempted array before creating the next one. Using the photographs, students decide on the definitions for prime, composite and square numbers.	Prime numbers	3✓	17✓	8✗	100✗	Composite numbers	15✓	42✓	7✗	23✗	Square numbers	4✓	25✓	10✗	29✗
Prime numbers	3✓	17✓	8✗	100✗													
Composite numbers	15✓	42✓	7✗	23✗													
Square numbers	4✓	25✓	10✗	29✗													

Western Australian Curriculum content	Teaching and learning intentions	Learning experiences
		<ul style="list-style-type: none"> Groups share their definitions with the class and arrive together at the correct meaning, with teacher guidance. <p>Learning experience 3</p> <ul style="list-style-type: none"> Provide counters for students to create different-sized square arrays, recording the number of rows and the total number of counters needed. Ask students to write number patterns that represent the increasing numbers of counters needed to create the squares. Students should recognise that the sequence of numbers of counters needed for the square shapes are square numbers. Challenge students to devise a rule they can use to predict the number of counters they would need to create a square with more rows than they can build. <p>Learning experience 4</p> <ul style="list-style-type: none"> Review the meaning of 'prime numbers' and 'composite numbers'. Discuss how to work out if a number is prime or composite. Provide pairs of students with numbers to sort into prime or composite piles. Students may need to draw arrays or factor trees to apply their knowledge of multiplication facts. In pairs, students explain their reasoning to the class.

Term 2 Week 3

Western Australian Curriculum content	Teaching and learning intentions	Learning experiences
<p>Number and algebra</p> <p>Calculating with number</p> <p>Choose and use flexible and efficient strategies to calculate with whole numbers, involving any of the four operations, and explore the use of the order of operations</p> <p>Use estimation and rounding to make reasonable evaluations and justify results</p>	<p>Learning intention</p> <p>To choose and use efficient strategies for multiplication</p> <p>To use estimating and rounding to make reasonable judgements</p> <p>Focus questions</p> <ul style="list-style-type: none"> How does understanding place value help you multiply with a tens number? What patterns do you notice when multiplying by 10, 100 or 1000? How does reversing the order in which two numbers are multiplied relate to the array model? How can you extend the array model to multiply three digits together and link that to the standard multiplication method? When would you choose to use long multiplication as a strategy? How did you decide which strategy is the most efficient for a particular problem? <p>Support notes</p> <p>Students may initially need to use 2 mm 10 × 10 grid paper to construct a rectangle and then partition the rectangle into the ‘tens’ and ‘ones’ of each number being multiplied.</p>	<p>Learning experience 1</p> <ul style="list-style-type: none"> Review mental strategies for solving multiplication questions that rely on place value and powers of 10. Ask students to investigate and explain relationships when multiplying by powers of 10, e.g. $4 \times 3 = 12$, $4 \times 30 = 120$, $4 \times 300 = 1200$. Review how to use an array model (see Support notes) and place value partitions to multiply a two-digit number by a two-digit number. Discuss the types of multiplication questions where the array model would be the most efficient strategy. Ask students how they would solve these questions using the array model. Provide students with multiplication questions to represent and solve using array models. <p>Learning experience 2</p> <ul style="list-style-type: none"> Review the array model and demonstrate the vertical multiplication algorithm, completing both forms to show that the two products found when multiplying by the ones and tens are different. <div style="display: flex; justify-content: space-around; align-items: flex-start;"> <div style="text-align: right;"> $\begin{array}{r} 34 \\ \times 27 \\ \hline 238 \\ 680 \\ \hline 918 \end{array}$ </div> <div style="text-align: right;"> $\begin{array}{r} 27 \\ \times 34 \\ \hline 108 \\ 810 \\ \hline 918 \end{array}$ </div> </div>

Western Australian Curriculum content	Teaching and learning intentions	Learning experiences												
	<table><tr><td></td><td>30</td><td>4</td><td></td></tr><tr><td>20</td><td>$20 \times 30 = 600$</td><td>$20 \times 4 = 80$</td><td>34 $\times 27$ 238 $\underline{680}$ 918</td></tr><tr><td>7</td><td>$7 \times 30 = 210$</td><td>$7 \times 4 = 28$</td><td>27 $\times 34$ 108 $\underline{810}$ 918</td></tr></table> <p>$27 \times 34 = 600 + 210 + 80 + 28$ $= (600 + 200) + (10 + 80) + 28$ $= 800 + 90 + 28$ $= 800 + 100 + 18$ $= 918$</p> <p>The above example demonstrates how to use an array model to multiply a two-digit number by another two-digit number.</p> <p>Efficiency may depend on the size of the numbers being calculated. For example, a vertical algorithm may not be the most suitable strategy for a two-digit by two-digit multiplication but would be more appropriate for multiplication problems involving four- or five-digit numbers. Reducing cognitive load by using factors and multiples, doubling strategies or powers of 10 may provide efficient methods, depending on the equation to be solved.</p>		30	4		20	$20 \times 30 = 600$	$20 \times 4 = 80$	34 $\times 27$ 238 $\underline{680}$ 918	7	$7 \times 30 = 210$	$7 \times 4 = 28$	27 $\times 34$ 108 $\underline{810}$ 918	<ul style="list-style-type: none">Ask students to look at each of the strategies and identify the relationships between the multiplied sections of the array model and the subtotals in the two long multiplication algorithms.Discuss when it is appropriate to use long multiplication and the importance of applying efficient strategies without relying on just one.Students roll a die four times to create a two-digit number by two-digit number multiplication question. They then apply the most efficient strategy to solve. <p>Learning experiences 3 and 4</p> <ul style="list-style-type: none">Make a list of known multiplication strategies, such as mental, array, factors and vertical multiplication with or without the use of a calculator.Ask students to suggest questions that could be solved using each strategy and discuss reasons why. Model strategies where required. Discuss what makes a strategy efficient, such as it saving time, resulting in accurate answers and requiring the least amount of effort.Provide students with multiplication questions written on cards. In small groups, students sort the cards by which strategy would be the most efficient method for solving it.Review the sorted cards as a class, and discuss questions students grouped differently.Discuss the usefulness of estimating before calculating and review the use of rounding as an estimation strategy.
	30	4												
20	$20 \times 30 = 600$	$20 \times 4 = 80$	34 $\times 27$ 238 $\underline{680}$ 918											
7	$7 \times 30 = 210$	$7 \times 4 = 28$	27 $\times 34$ 108 $\underline{810}$ 918											

Western Australian Curriculum content	Teaching and learning intentions	Learning experiences
	<p>Suggested assessment point</p> <p>The final activity in Learning experience 4 may be used as a formative assessment to evaluate students' ability to use rounding for estimation and to understand students' reasoning about which multiplication strategies are more efficient.</p>	<ul style="list-style-type: none">Students solve two questions from each strategy group, recording estimations and showing use of efficient strategies.

Term 2 Week 4

Western Australian Curriculum content	Teaching and learning intentions	Learning experiences
<p>Number and algebra</p> <p>Calculating with number Choose and use flexible and efficient strategies to calculate with whole numbers, involving any of the four operations, and explore the use of the order of operations</p> <p>Use estimation and rounding to make reasonable evaluations and justify results</p> <p>Modelling with number In real-world situations involving whole numbers, order of operations and fractions with the same denominator, use the following process</p> <ol style="list-style-type: none"> analyse the situation and identify relevant information mathematically represent the situation, including using equations to reach a solution interpret and communicate findings in the context, exploring and justifying decisions 	<p>Learning intention To choose and use efficient strategies for division and apply efficient multiplication and division strategies to solve real-world word problems</p> <p>Focus questions</p> <ul style="list-style-type: none"> How can you use knowledge of multiplication facts to support division? When would the array model be the most efficient strategy? Why can you partition a number in different ways when using the array model? How do you write remainders as a decimal and as a fraction? How do you know you need to use division to solve the problem? Why is it important to learn how to represent a problem with an equation (i.e. to end with an equals sign) before you solve it? <p>Support notes The learning experiences contain suggested division strategies. Teachers will need to refer to the calculation strategies taught at their own school and refine the activities where needed.</p>	<p>Learning experience 1</p> <ul style="list-style-type: none"> Review mental division strategies for two-digit numbers divided by one-digit numbers. This may include: <ul style="list-style-type: none"> halving for $\div 2$, $\div 4$, $\div 8$ using the inverse operation splitting the two-digit number into two numbers to create known facts. Model how to write remainders as whole numbers, fractions and decimals. Students apply mental strategies by playing a game with a partner. They roll a die three times to create a problem involving a two-digit number divided by a one-digit number. Students arrange the numbers rolled to create a question that will result in the smallest remainder. They score points for creating the question with the smallest remainder. Ask students which mental strategy they chose for the question and why. As a class, discuss strategies used for creating questions with the smallest remainder. <p>Learning experience 2</p> <ul style="list-style-type: none"> Review efficient written strategies for division. This may include the array model. Present students with a question and model the strategy.

Western Australian Curriculum content	Teaching and learning intentions	Learning experiences									
	<p>Suggested assessment point</p> <p>Teachers can assess students' ability to apply efficient multiplication and division strategies by reviewing their independent work on the word problems.</p>	<p>For example, to solve $219 \div 6$, the total 219 is broken into parts that are easy to divide by six. Each part is then divided by six to find how many groups it makes. The partial quotients (30, 5 and 1) are added to give the answer 36 with a remainder of 3.</p> <div style="display: flex; align-items: center; justify-content: center;"> <div style="margin-right: 10px;">6</div> <table border="1" style="border-collapse: collapse; text-align: center;"> <tr> <td style="width: 30px; height: 30px;"></td> <td style="width: 30px; height: 30px;"></td> <td style="width: 30px; height: 30px;"></td> </tr> <tr> <td style="width: 30px; height: 30px;"></td> <td style="width: 30px; height: 30px;"></td> <td style="width: 30px; height: 30px;"></td> </tr> <tr> <td style="width: 30px; height: 30px;"></td> <td style="width: 30px; height: 30px;"></td> <td style="width: 30px; height: 30px;"></td> </tr> </table> </div> <p style="margin-left: 150px;"> 30 5 1 </p> <p style="margin-left: 150px;"> 180 30 9 </p> <p>Answer = 36 remainder 3 or $36\frac{3}{6}$ or 36.5</p> <ul style="list-style-type: none"> Review writing the remainder as whole numbers, fractions and decimals. Ask students for alternative ways they could have used non-standard partitioning on 219 to get the same answer. Establish the relationship with using the array model for multiplication. Provide students with questions to answer, where they can apply the array model to three-digit and four-digit numbers divided by a one-digit number. <p>Learning experiences 3 and 4</p> <ul style="list-style-type: none"> Provide small groups of students with a deck of playing cards, with only the number cards included. Students place six cards out and then draw three more cards to create a three-digit number. Students can use all or some of the six cards and all or some of the four operations to try and create the three-digit number. All students attempt the task and then review the strategies used. Teachers can extend the game by adding in additional cards, such as 100, 75, 50 and 25. 									

Western Australian Curriculum content	Teaching and learning intentions	Learning experiences
		<ul style="list-style-type: none">• Provide students with real-world word problems to apply their knowledge of multiplication and division strategies. Begin with repeated equal groups and array problems (see examples in Appendix A).• Model how to analyse a problem, representing it in an equation and applying an efficient strategy to find the answer. Students individually solve additional problems, applying strategies to solve.

Term 2 Week 5

Western Australian Curriculum content	Teaching and learning intentions	Learning experiences
<p>Number and algebra</p> <p>Understanding number Represent and explain the multiplicative place value relationship between places in any number, including decimals</p> <p>Calculating with number Multiply decimals by whole numbers and multiply and divide decimals by powers of 10, using flexible and efficient strategies</p>	<p>Learning intention To explore what happens when a number is repeatedly multiplied and divided by 10</p> <p>To use mental and written strategies to multiply decimals by one- and two-digit numbers</p> <p>Focus questions</p> <ul style="list-style-type: none"> • What patterns apply to numbers multiplied or divided by powers of 10? • Why does the order of digits in a number not change when multiplied or divided by 10? • What strategies can you use to efficiently multiply a decimal number by a whole number? • How can whole number multiplication facts and doubling and/or halving strategies help you multiply decimal numbers? • How does partitioning help you when multiplying a decimal number by a whole number? • Why does multiplying by a decimal number sometimes make a number smaller? <p>Support notes Using a 10×10 grid to represent one will only make sense to students who have experienced this model previously. Therefore, the meaning of the model and the value of the first and second decimal place may need to be revisited when introducing this in Learning experience 4.</p>	<p>Learning experience 1</p> <ul style="list-style-type: none"> • Ask students to divide a sheet of paper into two columns and label one column 'multiply by 10' and the other 'divide by 10'. Students then choose a single-digit number and write it at the top of each column. • Students predict and record the results of repeatedly multiplying and dividing the single-digit number by 10. Students then check their predictions using a calculator. • Encourage students to try to explain to a classmate why the digit stays the same when multiplying or dividing by 10 and why other changes occur. • Ask students to investigate what happens when they apply the same process to two- and three-digit whole numbers, and decimals to one- and two-decimal places. • Students compare their investigation with a classmate and try to explain why these patterns occur in our number system when multiplying and dividing by 10. <p>Learning experience 2</p> <ul style="list-style-type: none"> • Ask students to write a number with three digits before the decimal point and two digits after the decimal point. Assist them to multiply and divide that number by powers of 10 without a calculator, justifying the result of each calculation. • Provide students with number sentences with missing parts to solve, e.g. $0.673 \square \square = 673$. • In pairs, ask students to create number sentences with missing parts involving multiplication or division of

Western Australian Curriculum content	Teaching and learning intentions	Learning experiences
	<p>Once students are confident using the array model on grid paper, guide them to use a more abstract diagram on blank paper, where the sections of the array model are representative of the grid paper arrays.</p>	<p>decimals by powers of 10, with different parts of the equation left blank. Pairs swap and solve the questions and explain their answers either verbally or by recording using words and diagrams.</p> <p>Learning experience 3</p> <ul style="list-style-type: none"> Model how to use mental strategies to multiply decimals with one decimal place by a one-digit number. These strategies may include: the use of doubling when multiplying decimals by 2, 4 or 8 and partitioning decimals into whole numbers and tenths then multiplying by one-digit numbers. Model how to use the array model to multiply a number with one decimal place by a two-digit number. Use grid paper to model visually. Draw students' attention to the section that represents multiplying a decimal less than one with another number and ask students to try to infer why the result will always be less than either of the multipliers. Give students similar multiplication equations as above to represent and solve. Allow students to use grid paper or to move on to the abstract diagram (see support notes) if they are confident with the grid paper method. <p>Learning experience 4</p> <ul style="list-style-type: none"> Allow this lesson and additional time if needed to complete the summative assessment Desert adventure (Appendix B).

Term 2 Week 6

Western Australian Curriculum content	Teaching and learning intentions	Learning experiences
Measurement and geometry Two-dimensional space and structures Describe and test a sequence of steps to determine the area of rectangles based on dimensions.	Learning intention To investigate the area of rectangles by manipulating dimensions Focus questions <ul style="list-style-type: none"> • If you know the length and width of a rectangle in centimetres, how could you work out the area of the rectangle without counting squares? • What happens to all the lengths, including the diagonal lengths, when you double the dimensions of the rectangle? • What happens to the area of the rectangle when you double the dimensions? 	Learning experience 1 <ul style="list-style-type: none"> • Provide students with centimetre grid paper to draw rectangles on. Ask students to devise a way to find the area of a rectangle they have drawn, using the length and the width of the rectangle rather than counting the squares in rows and columns. Ask them to explain and justify why their strategy must always work for rectangles. • Show students a rectangle not drawn on grid paper. Discuss with students why they can only calculate the area if they know or can work out the dimensions. • Students attempt to explain why they can only calculate the area of a rectangle from its total perimeter alone when it is a square. Learning experience 2 <ul style="list-style-type: none"> • Provide students with centimetre grid paper and ask them to draw two rectangles where the dimensions of the second is twice those of the first. • Tell students to record or measure the dimensions for both rectangles. Students calculate the area of each rectangle. • Students compare their measurements with a classmate's measurements to determine the relationship between the areas of the rectangles. They try to explain why the area is four times bigger when the dimensions are doubled. Students use a table to record measurements.

Western Australian Curriculum content	Teaching and learning intentions	Learning experiences
		<ul style="list-style-type: none"> Students repeat the activity with different rectangles to discover that the same relationship is maintained i.e. if the dimensions are doubled, the area quadruples. Challenge students to predict and test the relationship between the lengths and areas of rectangles that are three and four times the size of the original. <p>Learning experience 3</p> <ul style="list-style-type: none"> Provide students with square tiles. Ask students to see how many rectangles they can make while keeping the number of tiles the same. Students copy the shapes on grid paper and record the perimeter of each shape they make. Challenge students to find the longest and shortest perimeter they can with shapes that have the same area. Ask students how they found the rectangle with the longest perimeter. Discuss the results. <p>Learning experience 4</p> <ul style="list-style-type: none"> Provide students with grid paper and ask them to make rectangles that have the same perimeter. Students could extend this to using decimal measurements. Ask students to calculate the area of the rectangles. Discuss how shapes with the same perimeter can enclose different areas. Ask students to explore the relationships between perimeter and area, and use reasoning to find how a shape can have maximum area for minimum

Western Australian Curriculum content	Teaching and learning intentions	Learning experiences
		<p>perimeter, or maximum perimeter for minimum area. Teachers could provide students with a given area or a given perimeter to support this task. Ask students the following questions:</p> <ul style="list-style-type: none"> ▪ How do you know that the shapes you have made have the same perimeter? ▪ Which of the rectangles do you think will have the largest area? ▪ If you were building a rectangular vegetable garden, and wanted to spend the least amount of money on fencing it in, what dimensions would be the best to choose, and why? <ul style="list-style-type: none"> • Extend the task by asking students to start with a square that measures four tiles wide. For each new shape, they keep the perimeter at 16 ‘tile lengths’ while reducing the area by one tile at a time. Students record each new shape on grid paper. Discuss the results.

Term 2 Week 7

Western Australian Curriculum content	Teaching and learning intentions	Learning experiences
<p>Measurement and geometry</p> <p>Three-dimensional space and structures</p> <p>Visualise, sketch and construct three-dimensional objects, including prisms and pyramids</p>	<p>Learning intention</p> <p>To visualise, construct and sketch three-dimensional objects</p> <p>Focus questions</p> <ul style="list-style-type: none"> • What makes an object a pyramid or a prism? • What similar properties do pyramids and prisms have? • What polygons could be used to make a pyramid? • How can you represent a 3D object accurately when sketching? • Why do you need to consider the angles of the lines when sketching? • How does changing the viewing angle of a 3D object affect what we see and how we sketch it? <p>Support notes</p> <p>Isometric paper may be used to support students with the drawing of 3D objects.</p>	<p>Learning experience 1</p> <ul style="list-style-type: none"> • Review the properties and differences between prisms and pyramids by asking students to visualise and then describe the shapes. Provide students with models of prisms and pyramids to manipulate. • Provide students with popsticks, clay, straws and tape to construct different prisms and pyramids. Students record the properties of their shapes after construction. <p>Learning experience 2</p> <ul style="list-style-type: none"> • Show students examples of nets for pyramids with different polygon bases. Discuss how the angles of the base and the triangular faces affect the shape. • Students choose a polygon base and design a net for a pyramid. They use their protractor and what they know about angles to help them plan and draw. • Explicitly teach that the sum of angles at the apex must be less than 360° for the pyramid to close properly. • Encourage students to think about why it might be helpful to know that the three angles of a triangle add up to 180°. • Ask students guiding questions, such as: <ul style="list-style-type: none"> ▪ How does knowing that the three corners of a triangle add to 180° help your planning?

Western Australian Curriculum content	Teaching and learning intentions	Learning experiences
		<ul style="list-style-type: none"> ▪ Why could you not make a pyramid if the angles at the apex totalled to 360° or more? ▪ Could you construct a pyramid using an irregular polygon? How might that affect the angles at the apex? • Once students have constructed one pyramid, challenge them to create pyramids using irregular polygons for the base. <p>Learning experiences 3 and 4</p> <ul style="list-style-type: none"> • Show the class the isometric drawing tool at: National Council of Teachers of Mathematics: Illuminations – Isometric Drawing Tool https://www.nctm.org/Classroom-Resources/Illuminations/Interactives/Isometric-Drawing-Tool/. • Demonstrate how the program works by placing cubes, faces and edges and rotating the figure to view it different angles. • Present students with an image of a cube made on the program, discussing the views and what can be seen and why. • Model how to sketch the cube from different views. Discuss the need for lines to be parallel and at the same angle. • Provide students with access to the program and ask them to create a rectangular prism made using either the cubes, faces or edges tool.

Western Australian Curriculum content	Teaching and learning intentions	Learning experiences
		<ul style="list-style-type: none">• Ask students to rotate their object and look at the different views. Students then draw their rectangular prism from three different views.• Discuss which views are easiest or hardest to draw and why and how understanding multiple views help in design, engineering and architecture.• Extend the task by asking students to draw a different 3D object. They may need to research images online for ideas and support.

Term 2 Week 8

Western Australian Curriculum content	Teaching and learning intentions	Learning experiences
<p>Probability and statistics</p> <p>Statistics</p> <p>Describe and interpret a range of displays for real-life numerical data, including side-by-side column graphs, using mode, range and shape</p> <p>Describe how the features of real-life data displays may influence an audience</p>	<p>Learning intention</p> <p>To compare and interpret a range of real-life numerical data and describe the mode, range and shape of the graph</p> <p>Focus questions</p> <ul style="list-style-type: none"> • Why is a line graph used for certain kinds of data? • What kinds of data can be shown in a column graph but would not make sense in a line graph? • Why are percentages rather than numbers used in many graphs and tables? • How does the mode or range differ when the two categories of data are shown side by side? • Why is it important to look at the range and mode when describing data? 	<p>Learning experience 1</p> <ul style="list-style-type: none"> • Provide students with graphs and tables relevant to their context from the Australian Bureau of Statistics (ABS): https://www.abs.gov.au/statistics. • Ask students to compare and discuss the types of numbers that are used in graphs and tables, such as whole numbers, decimals and percentages. • Provide students with two graphs and ask students to list the similarities and differences. • Facilitate a class discussion about the kinds of questions that can and cannot be answered in reference to a particular graph. In pairs, students choose a different graph and list questions that can be answered using the information in the graph. <p>Learning experience 2</p> <ul style="list-style-type: none"> • Present students with graphs from magazines and newspapers or found in the media online. • In small groups, ask students to interpret and sort the graphs, choosing their own categories. • As a class, ask students to answer the following questions: <ul style="list-style-type: none"> ▪ How have you grouped the graphs? ▪ What message is the graph trying to communicate? ▪ How could you change the graph to make it clearer or fairer?

Western Australian Curriculum content	Teaching and learning intentions	Learning experiences
		<ul style="list-style-type: none"> • Then discuss what is represented by the axes and guide them to draw conclusions about the nature and purpose of the axes. • Provide examples of misleading graphs, such as those found on: Australian Association of Mathematics Teachers: Top Drawer Teachers – Misleading scales https://topdrawer.aamt.edu.au/Statistics/Misunderstandings/Misleading-graphs/Misleading-scales. • As a class, discuss the merits of the various graphs and the ways data was collected, to identify techniques used to distort or misrepresent data. These could include not starting columns from zero to exaggerate differences, basing the data on very small samples that are not representative or grouping data in ways that emphasise a particular viewpoint. <p>Learning experience 3</p> <ul style="list-style-type: none"> • Collect data from the Year 6 students about the number of extracurricular activities they complete each week (separated into weekday and weekend days). Discuss how the data could be presented. • Establish that the data can be represented in a side-by-side column graph with weekday and weekend day labelled columns, as well as in a regular column graph. • Students graph the data in a column graph and a side-by-side column graph. Discuss and compare the graphs. Ask students to describe the shape of the data in each graph.

Western Australian Curriculum content	Teaching and learning intentions	Learning experiences
		<ul style="list-style-type: none"> Using the column graph, model how to interpret the data to find the mode and range. Discuss the shape and how the data is spread i.e. if the data is grouped or spread out, and highs and lows within the graph. Students find the mode and range in the side-by-side column graph for weekdays and weekend days separately, then write comments on the shape of the graph. <p>Learning experience 4</p> <ul style="list-style-type: none"> Along a class table, tape several lines at regular increments and assign each one a number of points, e.g. 5, 10, 20. Explain to students they will push a paper cup so it slides along the desk. Where the cup stops will indicate the number of points they will score. They will have three goes each. Students create a table for recording their own results and complete the task with no practice. Repeat the process, recording a second set of data and acknowledging the first attempts count as practice. Collect the total scores from the class for the two separate attempts and discuss appropriate ways of displaying the data. Review how to calculate mode and range. Students record data from the whole class and calculate the mode and range. Students describe and interpret the two datasets.

The image features an abstract design with several orange circles of varying sizes. Some are solid, while others are outlines. A large solid orange circle is positioned on the right side, partially overlapping a horizontal orange bar at the bottom. To its left, a smaller solid orange circle is also visible. In the upper left, there are several overlapping circles, some as outlines and some as solid shapes. The bottom of the image is a solid horizontal orange bar.

Term 3

Weeks 1–8

Term 3 Overview – Learning intentions

	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8
Learning intention	NA CN MN To investigate the result of calculating operations in any order and introduce the order of operations	NA UN CN To connect finding a fraction of a number to finding decimal amounts and percentages of whole-number quantities	NA UN To order common fractions and mixed numerals on a number line	NA CN To use a range of strategies to add and subtract fractions with related denominators	MG 2DSS To explore translation, reflection and rotation by tessellating shapes and repeating a pattern	NA UN MG 2DSS To compare grid references to grid coordinate systems and use Cartesian plane coordinates to plot points and shapes	NA UEI To complete, check and construct statements of equality and inequality for the four operations	NA UN PS P To order everyday chance events on a scale from 0 to 1 To conduct chance experiments and compare expected and observed frequencies

NA Number and algebra
UN Understanding number
CN Calculating with number
2DSS Two-dimensional space and structures
MMG Modelling with measurement and geometry

MG Measurement and geometry
UEI Understanding equalities and inequalities
FM Financial mathematics
3DSS Three-dimensional space and structures
P Probability

PS Probability and statistics
PR Patterns and relationships
MN Modelling with number
NSM Non-spatial measurement
S Statistics

Western Australian Curriculum content	Term 3 Daily practice activities
<p>Number and algebra</p> <p>Understanding number Connect commonly used percentages, including 10%, 25% and 50%, to fractions and decimals, including on a number line</p> <p>Calculating with number Determine a familiar fraction, decimal or percentage of a whole number</p>	<p>Weeks 1–4</p> <p>Facilitate practice activities to consolidate informal strategies for calculating percentages, finding fractions of whole numbers and connecting the two processes. Students explain the similarities between the two processes – both are finding a part of a whole.</p>
<p>Number and algebra</p> <p>Calculating with number Choose and use flexible and efficient strategies to calculate with whole numbers, involving any of the four operations, and explore the use of the order of operations</p> <p>Multiply decimals by whole numbers and multiply and divide decimals by powers of 10, using flexible and efficient strategies</p> <p>Measurement and geometry</p> <p>Two-dimensional space and structures Investigate angles in a right angle, on a straight line, angles at a point and vertically opposite angles, to determine unknown angles and explain reasoning</p>	<p>Weeks 5–8</p> <p>Facilitate activities for students to practise and explain their calculation strategies in the context of the full range of different problem types. Ensure students have frequent opportunities to:</p> <ul style="list-style-type: none"> • use brackets to indicate which part of a number sentence should be calculated first, and manipulate number sentences with brackets to solve in order of operations • understand the effects of multiplying and dividing decimals (including decimal representations of metric units) and explain why knowing this makes conversions between units easier • consolidate understandings about the circumstances in which angles must sum to 360° and 180°, and practise calculations involving those circumstances to find unknown angles.

Term 3 Week 1

Western Australian Curriculum content	Teaching and learning intentions	Learning experiences
<p>Number and algebra</p> <p>Calculating with number Choose and use flexible and efficient strategies to calculate with whole numbers, involving any of the four operations, and explore the use of the order of operations</p> <p>Add and subtract decimals to two decimal places, using flexible and efficient strategies</p> <p>Use estimation and rounding to make reasonable evaluations and justify results</p> <p>Modelling with number In real-world situations involving whole numbers, order of operations and fractions with the same denominator, use the following process</p> <ol style="list-style-type: none"> analyse the situation and identify relevant information mathematically represent the situation, including using equations to reach a solution interpret and communicate findings in the context, exploring and justifying decisions 	<p>Learning intention To investigate the result of calculating operations in any order and introduce the order of operations</p> <p>Focus questions</p> <ul style="list-style-type: none"> How does the answer change if different operations are carried out in different orders? Which operations can be calculated in a different order without changing the result, and which cannot? What strategies helped you connect the expressions to real-world contexts? <p>Support notes At the beginning, avoid using acronyms such as BIMDAS – the acronyms may cause confusion at this stage, as indices have not yet been introduced. Students need to make sense of the mathematics they are learning rather than rote memorisation. They also need to know that multiplication and division are carried out from left to right in the order in which they appear – it is not the case that multiplication is always done before division.</p> <p>When teaching order of operations, it is beneficial to supply the answer to the problem, so the focus moves from finding a solution to applying the correct process when solving the problem.</p>	<p>Learning experience 1</p> <ul style="list-style-type: none"> As a class, explore the differing results obtained from carrying out calculations in different orders in problems that involve more than one operation, e.g. $3 \times 4 \div 2$ or $4 \div 2 \times 3$. Discuss which operation combinations can have the order changed and which cannot. Provide a word problem such as: Daisy saved \$5 per week for three weeks. She then had a birthday, and her nana gave her \$25. She gave \$6 to her little sister, and then for the next six weeks, she saved \$4 each week. How much money does she have? In pairs, students work out the answer first using informal methods, before writing the numbers and operations in the sequence they occur in the problem, e.g. $5 \times 3 + 25 - 6 + 6 \times 4$. Ask students why they think it was decided that brackets are not needed around multiplications or divisions. Ask students to explore the different results they get when calculations are made in different orders, using brackets to show which they did first. For example: Daisy saved \$5 per week for three weeks. She then had a birthday, and her nana gave her \$25. She gave \$6 of her birthday money to her little sister, and then for the next six weeks, she saved \$4 each week. How much money does Daisy have? For example: $5 \times 3 + (25 - 6) + 6 \times 4 =$ Establish the correct order for the problem.

Western Australian Curriculum content	Teaching and learning intentions	Learning experiences
		<ul style="list-style-type: none"> Introduce the convention that after all calculations within brackets are completed, multiplicative operations are carried out before additive operations. <p>Learning experience 2</p> <ul style="list-style-type: none"> Review the previous learning experience and provide additional problems for students to explore and establish when brackets are needed. For example: Amy does some gardening for her nana each week. Her nana pays her \$3 per week and her mum gives her an extra \$2 per week. How much money will she have earned after six weeks? Represent the problem as a number sentence (e.g. $3 + 2 \times 6$). Invite students to 'multiply before they add' and discuss whether the answer is or is not correct for the problem. Assist students to understand why the addition must be represented using brackets, e.g. as $6 \times (3 + 2)$ or $(3 + 2) \times 6$. In the case of the example, it is to ensure the weekly total is calculated before it is multiplied by the weeks. Verbally discussing or writing out the problem (e.g. three dollars plus two dollars is five dollars, and this five dollars is then multiplied by six weeks) is helpful to understand the reason why the bracketed equation must be solved first. <p>Learning experience 3</p> <ul style="list-style-type: none"> Provide students with expressions and ask them to work in pairs to write word problems. Model writing a word

Western Australian Curriculum content	Teaching and learning intentions	Learning experiences
		<p>problem for an expression first. Students justify their word problems to classmates, explaining how the given expressions represent their problems.</p> <p>Learning experience 4</p> <ul style="list-style-type: none">• Provide students with expressions written on cards with answers that are either correct or incorrect. Include all four operations and some using decimal numbers. In small groups, students sort the cards and discuss how the expressions should be solved and where they think the errors have been made. Review the sort and discuss findings. Ask students to put in the brackets to make the incorrect examples workable.

Term 3 Week 2

Western Australian Curriculum content	Teaching and learning intentions	Learning experiences
<p>Number and algebra</p> <p>Understanding number Connect commonly used percentages, including 10%, 25% and 50%, to fractions and decimals, including on a number line</p> <p>Calculating with number Determine a familiar fraction, decimal or percentage of a whole number</p>	<p>Learning intention To connect finding a fraction of a number to finding decimal amounts and percentages of whole-number quantities</p> <p>Focus questions</p> <ul style="list-style-type: none"> • How could you find a fraction of any number? • How could you write the process for finding a fraction of a number as a general instruction? • How is the process for finding a decimal or a percentage of a number the same as finding a fractional amount? • How is dividing by 10 or 100 easier than dividing by smaller denominators? • How might knowing what one percentage point is worth help you work out 10%, 25% or 50% of \$200? • How would you explain the process needed to find any percentage of any amount? <p>Support notes Prior learning is required if students are not yet fluent with the fractional representation of both decimals and percentages, e.g. $0.5 = \frac{5}{10}$ and $50\% = \frac{50}{100}$.</p> <p>When calculating percentage off in Learning experience 4, ensure students understand that they need to calculate the percentage off, and then subtract that from the cost of the item. For example, when the full</p>	<p>Learning experience 1</p> <ul style="list-style-type: none"> • Review with students how to find a fraction of a collection of objects using concrete materials, and relate this to finding a fraction of a number. • Establish that multiplication is the symbol used to represent finding a fraction of a quantity. For example, finding $\frac{1}{5}$ of 25 children by multiplying the fraction with the whole i.e. $\frac{1}{5} \times 25 = 5$. • Provide practice for students to find unit fractions of different numbers by relating to multiplication facts. • Model using a number line to show how a unit fraction can be used to find other fractions, e.g. how $\frac{1}{5}$ can be used to find $\frac{2}{5}$, $\frac{3}{5}$ and $\frac{4}{5}$ of whole numbers. • Challenge pairs of students to write a general instruction to find any fraction of any number. <p>Learning experiences 2 and 3</p> <ul style="list-style-type: none"> • Review connecting decimals, percentages and fractions by providing some examples to ensure students can fluently convert between equivalent representations. For example, connecting 20%, 0.20 and $\frac{1}{5}$. • Provide practice for pairs of students to find percentages and decimals of different numbers, first writing them as fractions, and then following the instructions they developed in Learning experience 1.

Western Australian Curriculum content	Teaching and learning intentions	Learning experiences
	<p>price cost is \$205 and the discount is 10%, students calculate 10% (\$20.50) and subtract that from \$205, coming to the discounted cost of \$184.50.</p>	<ul style="list-style-type: none"> Ask questions to ensure students understand the process. For example, when finding a percentage, dividing by 100 gives them the value of $\frac{1}{100}$ or 1% of the number; and when finding a decimal, dividing by 10 gives them the value of $\frac{1}{10}$, or 0.1 of the number. Assist students to create a table or diagram that would help another Year 6 student understand that all three concepts (fractions, decimals and percentages) are connected and can all be calculated as fractions. <p>Learning experience 4</p> <ul style="list-style-type: none"> Re-establish the meaning of a percentage as ‘out of every 100’ but also that 1% is one-hundredth of a total amount. Review that 1% of any quantity can be found by dividing the amount by 100. Relate this to finding fractions and decimals of numbers. Ask students to use their calculators to work out the value of 1% of different amounts of money. In pairs, ask students how they are then able to work out what 10%, 25% or 50% of those amounts of money would be. Challenge students to calculate what they would pay for items from genuine advertisements (or constructed advertisements) offering discounts.

Term 3 Week 3

Western Australian Curriculum content	Teaching and learning intentions	Learning experiences
<p>Number and algebra</p> <p>Understanding number</p> <p>Order common fractions with the same and related denominators, including mixed numerals, using diagrams and number lines</p>	<p>Learning intention</p> <p>To order common fractions and mixed numerals on a number line</p> <p>Focus questions</p> <ul style="list-style-type: none"> • Why does knowing if the fraction is smaller or larger than one-half help with ordering? • What do we mean by related denominators? • What mistake might someone make when comparing fractions with different denominators? <p>Support notes</p> <p>Cuisenaire rods could be used as a resource to support the comparing and ordering of fractions. Printable templates for Cuisenaire rods are available online.</p>	<p>Learning experience 1</p> <ul style="list-style-type: none"> • Provide students with paper strips of equal length. Establish the paper strips represent a number line from 0 to 1. Model how to fold (or measure then fold) the paper strips to create a range of fraction lines. Students use the strips of paper to make fractions, such as halves, quarters, eighths, thirds and sixths. Students glue strips underneath each other and record equivalent fractions. • Ask the class the following questions: <ul style="list-style-type: none"> ▪ Why do all the paper strips need to be the same length? ▪ Why is it useful to know equivalent fractions when ordering fractions? ▪ What relationships between fractions did you notice? • As a class, review relationships between equivalent fractions. <p>Learning experience 2</p> <ul style="list-style-type: none"> • Establish that when ordering fractions, using the benchmark of a half can help understand the size of a fraction. • Show students a fraction such as $\frac{6}{8}$ and establish the fraction is less than one but bigger than a half. Discuss how we know this. • Draw a number line and partition it accurately into eight equal parts with a ruler. Place one-half and $\frac{6}{8}$ on the number line and discuss the relationship between the fractions. Extend the task by asking students what other fractions could be placed on this number line.

Western Australian Curriculum content	Teaching and learning intentions	Learning experiences
		<ul style="list-style-type: none"> Provide students with fractions to place on separate number lines, one fraction at a time. Students draw the number line, partition it into parts and then locate half and the given fraction. Extend the task by asking students to place two or three fractions with related denominators on the number line. <p>Learning experience 3</p> <ul style="list-style-type: none"> Show students three fractions with related denominators, including one that is a mixed numeral, e.g. $\frac{3}{4}$, $1\frac{1}{2}$ and $\frac{2}{8}$. Discuss the relationships between the fractions and how students would partition a number line to order the fractions. Model drawing the number line and as a class, place the fractions along it. Provide pairs of students with a set of three or more fractions to order on a number line. Ensure the fractions have either the same or related denominators, and include fractions that equal more than one. <p>Learning experience 4</p> <ul style="list-style-type: none"> Students play an online game related to fractions, such as: Education Services Australia & Scootle – Fraction fiddle: hit the apple https://www.scootle.edu.au/ec/viewing/L2804/index.html#. After playing, students design a game that similarly relies on ordering fractions with the same or related denominators, including mixed numerals. The game must include diagrams or the use of number lines. Students should include an explanation of how the game works and how it relies on the use of ordering fractions. If time allows, create the game.

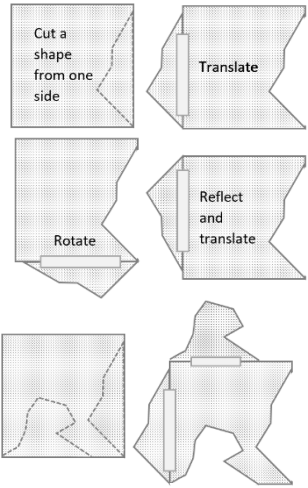
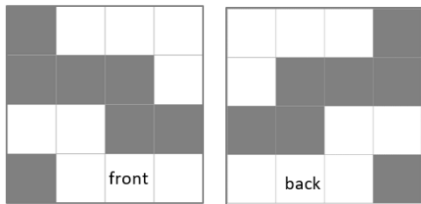
Term 3 Week 4

Western Australian Curriculum content	Teaching and learning intentions	Learning experiences
<p>Number and algebra</p> <p>Calculating with number</p> <p>Add and subtract fractions with related denominators using flexible and efficient strategies based on knowledge of equivalence</p>	<p>Learning intention</p> <p>To use a range of strategies to add and subtract fractions with related denominators</p> <p>Focus questions</p> <ul style="list-style-type: none"> • Why do fractions need to have the same denominators before we can add or subtract them? • How can equivalent fractions help us when adding and subtracting? • What does each part of the mixed numeral represent? • How does a number line help support adding and subtracting mixed numerals? • How can you use a number line to check if your answer is correct? • Which problems can be represented with a part-part-whole model, and which cannot? • How can sequences of equivalent fractions help you to add and subtract fractions with different denominators? <p>Support notes</p> <p>Encourage students to use informal, meaningful strategies for finding equivalence when adding or subtracting fractions with related denominators. This may include using knowledge of multiples and factors to write sequences of equivalences to assist in finding</p>	<p>Learning experience 1</p> <ul style="list-style-type: none"> • Review how to add and subtract fractions with the same denominator. • Show the class an addition question involving two fractions with related denominators. Model how to solve the question using a visual model such as a fractions bar, shading the parts to obtain the answer. Additionally, show students how the same question could be solved by jotting down or recalling equivalent fractions. • Establish how to simplify answers or record them as mixed numerals where required. • Model the process of using the fractions bar or equivalent fractions for a subtraction question involving two fractions with related denominators. • Provide students with addition and subtraction questions involving fractions with related denominators. Students find answers using both strategies to show their understanding. Ask students to justify how they simplified their answers. <p>Learning experience 2</p> <ul style="list-style-type: none"> • Model the use of a number line for adding and subtracting mixed numerals with the same and related denominators. • Provide pairs of students with similar questions. Students work together to draw, partition and label a number line and then complete the calculations.

Western Australian Curriculum content	Teaching and learning intentions	Learning experiences
	<p>suitable equivalent fractions with the same denominators, e.g.</p> $\frac{1}{2}, \frac{2}{4}, \frac{3}{6}, \frac{4}{8}, \frac{5}{10} \dots \text{ or } \frac{1}{3}, \frac{2}{6}, \frac{3}{9}, \frac{4}{12} \dots \text{ or } \frac{1}{5}, \frac{2}{10}, \frac{3}{15}, \frac{4}{20}$	<p>Learning experience 3</p> <ul style="list-style-type: none"> • Show the class a word problem that involves addition or subtraction of fractions. For example: Peter ate $\frac{1}{4}$ of the chocolate bar and Amy ate $\frac{1}{8}$ of the same chocolate bar. What fraction of the chocolate bar did they eat altogether? What fraction of the chocolate bar is yet to be eaten? • Model how to represent the problem with a part-part-whole model, bar model or a number line. • Establish the need to use equivalent fractions so both fractions have the same denominator for adding or subtracting. Complete calculations to show the answer to both parts of the problem. • Provide students with similar word problems to solve. <p>Learning experience 4</p> <ul style="list-style-type: none"> • Revise the use of the part-part-whole model and equivalents to add and subtract fractions. • Provide fraction problems based on measurements. Topics could include cooking, distances or money. Mix different problem types, such as start unknown or change unknown, so that students need to identify the operations required. <p>Encourage students to draw their own diagrams to model the structure of the problems and explain their diagrams to classmates. They should write equations to represent the problems and justify their choice of operation.</p>

Term 3 Week 5

Western Australian Curriculum content	Teaching and learning intentions	Learning experiences
<p>Measurement and geometry</p> <p>Two-dimensional space and structures Explore, visualise and describe translations, reflections or rotations of two-dimensional shapes</p> <p>Investigate angles in a right angle, on a straight line, angles at a point and vertically opposite angles, to determine unknown angles and explain reasoning</p>	<p>Learning intention To explore translation, reflection and rotation by tessellating shapes and repeating a pattern</p> <p>Focus questions</p> <p>Learning experience 1</p> <ul style="list-style-type: none"> • What do the angles at the corners tell you about whether a polygon will or will not tessellate? • How could you figure out in advance which combinations of transformation will or will not work together when creating the templates? • Why do some combinations of reflections and rotations result in the same pattern? • Why is it necessary to include direction and angle when providing instructions for another to create a particular pattern? <p>Support notes The line-drawn copies of Escher's prints may be easier for students to analyse than the original fully coloured designs.</p>	<p>Learning experience 1</p> <ul style="list-style-type: none"> • Show students an artwork that has been created by tessellating a shape, e.g. Escher's works. Identify rotations, reflections and translations within the chosen artwork. • Provide students with card and ask them to draw and cut out an irregular quadrilateral to use as a tessellating template. Students tessellate the shape by tracing around it, translating it and continuing to trace around it. • Students identify transformations (translation, reflection or rotation) within their tessellation. • Ask students to use a protractor to measure the size of the angle at each corner where all shapes meet. They then add the size of the four angles together. • Ask students which other polygons could transform into a tessellating pattern. Ask students to consider how knowing the size of a shape's corner angles helps them decide if it will tessellate. • Review the task to establish that all quadrilaterals will tessellate because the sum of their interior angles always equals 360°, so the shapes can fit together without leaving gaps or overlapping. <p>Learning experiences 2 and 3</p> <ul style="list-style-type: none"> • Review which regular polygons can tessellate and remind students that for a shape to tessellate, the sum

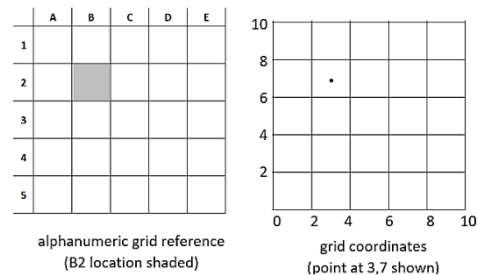
Western Australian Curriculum content	Teaching and learning intentions	Learning experiences
	<p>Examples for Learning experience 2 can be seen below.</p>  <p>The way the new shape needs to be moved when tessellating it matches the transformations used to create the new shape.</p> <p>Examples for Learning experience 4 can be seen below.</p> 	<p>of the inside angles at the meeting points must add to 360°.</p> <ul style="list-style-type: none"> • Provide each student with a cardboard square and adhesive tape. Demonstrate how to change the shape by cutting a piece from one side and translating and taping the cut piece to the opposite side (see the example in Support notes). • Students perform one transformation by either translating or rotating to create a new shape of their own. They then attempt to tessellate their shape, using the cardboard shape as a template and drawing around it. • Students explain to a classmate which transformation they used to create their new shape and which transformation they used to tessellate the shape. • Challenge students to make more complex tessellating shapes by cutting out a piece from a different side, then moving and taping that piece to a new position (see the example in the Support notes). • Encourage students to try tessellating their new shape. Ask students to work out why their shape may or may not tessellate, sharing their reasoning with a classmate. • Extend the task by providing cardboard rectangles and equilateral triangles for students to use to create new shapes. Help them explore the combinations of transformations that will or will not allow their new shapes to tessellate.

Western Australian Curriculum content	Teaching and learning intentions	Learning experiences
		<p>Learning experience 4</p> <ul style="list-style-type: none"> • Tell students to shade a non-symmetrical design on a 4×4 grid and make a reverse copy on the back, labelled as 'front' and 'back'. • Students copy their pattern unit repeatedly to create patterns on grid paper, transforming the pattern unit systematically each time it is copied. • Ask students to try different combinations of transformations and identify situations where two different kinds of transformations result in the same pattern. • Ask students to swap their pattern with a classmate and provide instructions for the transformations needed to create one of their patterns. • Compare the results and problem-solve the reason for any variations they find between the original pattern and the pattern made by following the instructions.

Term 3 Week 6

Western Australian Curriculum content	Teaching and learning intentions	Learning experiences
<p>Number and algebra</p> <p>Understanding number Investigate the use of positive and negative integers to represent everyday situations. Read, write and order integers on a number line</p> <p>Measurement and geometry</p> <p>Two-dimensional space and structures Explore the Cartesian plane as the intersection of two number lines at zero, using the coordinate system to locate points in all four quadrants</p>	<p>Learning intention To compare grid references to grid coordinate systems and use Cartesian plane coordinates to plot points and shapes</p> <p>Focus questions</p> <p>Learning experience 1</p> <ul style="list-style-type: none"> • What advantages are there in using grid coordinates rather than an alphanumeric grid reference system? • What strategy/ies could you use to remember the names of the quadrants? • How can you find and describe a point on the Cartesian plane that is between two grid lines? • What do you need to be careful about when writing a set of coordinates down? <p>Support notes Students don't always realise that the axes in a coordinate system are number lines with values in the spaces between the grid lines. Labelling the grid lines in Learning experience 1 with even numbers gives students an opportunity to identify the number</p>	<p>Learning experience 1</p> <ul style="list-style-type: none"> • Provide an alphanumeric labelled grid on the whiteboard and ask students to mark various locations with an 'X'. Review where the X symbols were placed and demonstrate how the letter-number reference of each marked X helps to describe the location. • Have students erase the alphanumeric numbering, and relabel the grid lines, starting from zero at the bottom-left corner and numbering the grid lines in multiples of two along both axes (see Support notes). • Tell students that they have turned a grid reference system into a grid coordinate system. • Students provide the location of each X by identifying its coordinates on the map. Students record the coordinates of the Xs, approximating positions using whole and decimal numbers, using their ruler if necessary. <p>Learning experience 2</p> <ul style="list-style-type: none"> • Provide students with 1 cm grid paper and model how to draw and label the Cartesian plane coordinate system. • Show students how to label the quadrants, the axes (using x, y) and the origin. Discuss where positive and negative values appear in each quadrant. Ask students which quadrant is called the 'positive quadrant' and which is called the 'negative quadrant'. Ask the students to explain why.

positions between the grid lines before they are expected to identify decimal positions.



Resources to support demonstrating creating and plotting coordinates on a Cartesian plane include:

- Math Antics – Algebra Basics: Graphing On The Coordinate Plane
<https://www.youtube.com/watch?v=9Uc62CuQjc4>
- Victoria State Government, Victorian Department of Education & Arc – Plotting points on a Cartesian plane
<https://arc.educationapps.vic.gov.au/learning/sites/mcc/VCMNA255/Plotting-points-on-the-Cartesian-plane>.

Suggested assessment point

Learning experience 4 offers the opportunity to assess students' understanding of the Cartesian plane coordinate system, their ability to plot given ordered pairs and their ability to follow instructions that relate to features of the Cartesian coordinate system that they have previously learned.

- Demonstrate how coordinates are found and recorded as ordered pairs. Ask students to practise finding and recording coordinates in all four quadrants.
- In pairs, students play a grid target game with a barrier between them. Each student chooses positions of objects on their Cartesian plane and then take turns using ordered pairs and correct language to try and 'hit' their classmate's objects. The first to hit all their classmate's objects wins. Students record their hits and misses correctly using the (x, y) format.

Learning experience 3

- Provide students with Cartesian grids on which to draw straight-sided shapes. On a separate sheet of paper, ask students to list the coordinates in the sequence needed to reproduce the shapes they have drawn.
- Students swap their lists of coordinates with a classmate. Each student uses a blank Cartesian grid to reproduce their classmate's drawing by following the set of ordered pairs. When they finish, they swap back, comparing their drawings and problem-solving the reason for any deviations.

Learning experience 4

- Provide lists of coordinates that students need to follow to create shapes, as well as sets of instructions for shape transformations that students must interpret, draw correctly on the Cartesian plane and list the ordered pairs for. For example:
 - Draw a pentagon that has one coordinate in Quadrant 2 and the rest of its coordinates are all positive numbers.

Western Australian Curriculum content	Teaching and learning intentions	Learning experiences
		<ul style="list-style-type: none">▪ Draw an L-shaped polygon in the positive quadrant so that a rotation of that shape would place it entirely in the negative quadrant. Draw the rotated shape as well as the original.• Ask students to follow the directions to complete the shapes according to the instructions and restrictions provided.

Term 3 Week 7

Western Australian Curriculum content	Teaching and learning intentions	Learning experiences
<p>Number and algebra</p> <p>Understanding equalities and inequalities Complete, check and construct statements of equality and inequality involving the four operations, including the use of brackets and order of operations, and explain reasoning</p>	<p>Learning intention To complete, check and construct statements of equality and inequality for the four operations</p> <p>Focus questions</p> <ul style="list-style-type: none"> • How do you know a given statement is true? • Can you make two different statements that are true using the same numbers? • What is the smallest change you can make to turn this false statement into a true one? 	<p>Learning experience 1</p> <ul style="list-style-type: none"> • Provide students with an equation without the brackets, e.g. $5 + 6 \times 3 = 33$. Review where to place the brackets in the equation to make the statement true. • In pairs, students write 10 equations with a minimum of three numbers, two operations and the brackets missing. Students swap number sentences with another pair and place the brackets correctly into the given number sentences. Ask students to think about if there is more than one correct position to place the brackets. Pairs discuss answers. <p>Learning experience 2</p> <ul style="list-style-type: none"> • Present students with statements that have equality and/or inequality symbols missing from the centre, e.g. $(7 - 2) \times 4 \text{ ______ } 3 + 2 \times 4$. • Review the order of operations and discuss how it applies to each part of the statement, to establish the missing symbol. • Students complete statements individually then compare results with a partner and explain their reasoning. Ask students to discuss the following questions; <ul style="list-style-type: none"> ▪ How does the order of operations apply to the statement? ▪ Which side did you think was bigger before you calculated and why?

Western Australian Curriculum content	Teaching and learning intentions	Learning experiences
		<p>Learning experiences 3 and 4</p> <ul style="list-style-type: none"> • Show students statements involving whole numbers, fractions or decimals and any of the four operations. As a class, discuss if the statements are true or false. Ask students to share the reasoning behind their answers and establish how to make the false statements true. • In pairs, students write their own statements involving whole numbers, fractions or decimals and any of the four operations – some must be true and some false. • Students use the statements to make a digital quiz for their classmates to complete. Students complete each other's digital quizzes and give feedback.

Term 3 Week 8

Western Australian Curriculum content	Teaching and learning intentions	Learning experiences
<p>Number and algebra</p> <p>Understanding number Connect commonly used percentages, including 10%, 25% and 50%, to fractions and decimals, including on a number line</p> <p>Probability and statistics</p> <p>Probability Order everyday chance events and phrases on a scale from 0 to 1, where 0 represents an event that is certain not to happen (impossible) and 1 represents an event that is certain to happen</p> <p>Conduct repeated chance experiments and simulations with equally likely or unequally likely outcomes, including with the use of digital tools, for an increasing number of trials. Compare expected and observed frequencies in terms of variation as the number of trials increase</p>	<p>Learning intention To order everyday chance events on a scale from 0 to 1</p> <p>To conduct chance experiments and compare expected and observed frequencies</p> <p>Focus questions</p> <ul style="list-style-type: none"> How could you compare a percentage and a fraction to decide where to place the probabilities? Explain and justify the relationship between a percentage and a decimal probability statement. How can you predict the number of times you expect to get a 'one' if you throw a die 100 times? What do you think might happen if we threw the die 100 000 times? How do you know there are more ways to get some results than others? What would you be looking for to decide if a game was fair or unfair? Why is it useful to convert the actual frequencies of each set of winning results to percentages when making comparisons with the expected probability? What difference could that make? 	<p>Learning experience 1</p> <ul style="list-style-type: none"> Provide a range of probability statements that involve fractions, decimals or percentages. For example, the chance of either of my two friends' names being pulled out of a hat holding the names of 30 students is $\frac{2}{30}$. Include probability statements that result in a probability of 1 or 0. <p>Challenge students to draw a number line from 0 to 1 and then place each probability on the number line according to its value. Ask students to share their number line placements with a classmate and discuss any differences, justifying their reasoning and then coming to a consensus about the correct positioning.</p> <p>Learning experience 2</p> <ul style="list-style-type: none"> Provide each pair of students with a 10-sided die. Establish that each number has an equal chance of being thrown. <p>Ask students to throw the die 10 times and record each result. Discuss results across the class.</p> <p>Establish the expected frequency of each result after 100 throws and 1000 throws.</p> <ul style="list-style-type: none"> Ask students to repeatedly throw the 10-sided die, recording each result, so that the combined number of throws for the class would total exactly 1000. As a class, calculate the percentage of times each number was

Western Australian Curriculum content	Teaching and learning intentions	Learning experiences																																																	
	<p>Support notes</p> <p>An example of the grid students create in Learning experience 3.</p> <table><tr><td></td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td></tr><tr><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td></tr><tr><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td></tr><tr><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td><td>9</td></tr><tr><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td><td>9</td><td>10</td></tr><tr><td>5</td><td>6</td><td>7</td><td>8</td><td>9</td><td>10</td><td>11</td></tr><tr><td>6</td><td>7</td><td>8</td><td>9</td><td>10</td><td>11</td><td>12</td></tr></table> <p>Suggested assessment point</p> <p>Teachers may observe behaviours and explanations in Learning experience 4 as a formative assessment.</p>		1	2	3	4	5	6	1	2	3	4	5	6	7	2	3	4	5	6	7	8	3	4	5	6	7	8	9	4	5	6	7	8	9	10	5	6	7	8	9	10	11	6	7	8	9	10	11	12	<p>thrown out of the total throws. Ask students the following questions:</p> <ul style="list-style-type: none">▪ After one thousand throws, how much closer were the expected (theoretical) results to the actual results?▪ Why do you think there was much more variation in the percentage of times each result was thrown in 10 throws when compared to 1000 throws?• Discuss and compare the expected probability with the percentages of each result after 10 throws and 1000 throws. Discuss why the percentage results after 1000 throws were much closer to the expected probability than after 10 throws. <p>Learning experience 3</p> <ul style="list-style-type: none">• Provide pairs of students with two six-sided dice and the following rules:<ul style="list-style-type: none">▪ Take turns throwing the two dice.▪ Player A scores one point if the result of throwing the two dice is 2, 3, 4, 11 or 12.▪ Player B scores one point if the result of throwing the two dice is 5, 6, 7, 8 or 9.▪ No-one scores if 10 is thrown.▪ Play the game for five minutes.▪ The player with the most points wins.• Ask students to record and display the results to deduce why Player B won more often than Player A. Model how to record the outcomes on a 6 × 6 grid, using a different colour for each die. Assist students to express the probability of each result as a fraction.
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Western Australian Curriculum content	Teaching and learning intentions	Learning experiences
		<ul style="list-style-type: none"> Challenge students to calculate the probabilities of Player A and Player B winning a point in the game, to prove the game was unfair. Pose the question: 'How would you plan a fair game with two 10-sided dice for four players, each with a set of winning numbers?' <p>Learning experience 4</p> <ul style="list-style-type: none"> Place students in small groups and provide each group with two 10-sided dice. Ask students to work out a game for four players, assigning each with a set of results that should provide an equal chance of winning for each player. Students must use probabilities to prove their game is fair. Students play each other's games and record every result thrown on a tally sheet, listing the 19 possible results (2 through to 20). Groups collect the results from others playing their game. They use these results to calculate the total number of times each total (2 to 20) was thrown for their game, and the overall total number of throws. The groups use this information to calculate the total winning throws for each player in that game i.e. how often the winning sets of numbers allocated to each player were thrown. Each group of students compare the expected frequency of the winning sets of numbers to the actual frequency of winning throws for each player and discuss the meaning of the differences.



Term 4

Weeks 1–8

Term 4 Overview – Learning intentions

	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8
Learning intentions	NA FM PS S To plan an event to achieve a savings goal	NA CN MG 2DSS To convert between units of mass and apply this knowledge to solve problems	NA CN MG 2DSS MMG To convert between different units of capacity and apply this knowledge to solve problems	MG 3DSS MMG To describe a sequence of steps to determine the volume of rectangular prisms and test using a real-world situation	NA CN MN To apply knowledge of fractions and whole numbers to solve real-world situations	MG 2DSS To use knowledge of angles on a straight line, angles at a point and vertically opposite angles to determine unknown angles	PS S To plan and conduct a data investigation, choose appropriate data displays and interpret findings	MG NSM MMG To create an itinerary for a real-world situation using knowledge of 12- and 24-hour time systems and duration of events and journeys

NA Number and algebra
UN Understanding number
CN Calculating with number
2DSS Two-dimensional space and structures
MMG Modelling with measurement and geometry

MG Measurement and geometry
UEI Understanding equalities and inequalities
FM Financial mathematics
3DSS Three-dimensional space and structures
P Probability

PS Probability and statistics
PR Patterns and relationships
MN Modelling with number
NSM Non-spatial measurement
S Statistics

Western Australian Curriculum content	Term 4 Daily practice activities
<p>Number and algebra</p> <p>Understanding number Order common fractions with the same and related denominators, including mixed numerals, using diagrams and number lines</p> <p>Connect commonly used percentages, including 10%, 25% and 50%, to fractions and decimals, including on a number line</p> <p>Calculating with number Choose and use flexible and efficient strategies to calculate with whole numbers, involving any of the four operations, and explore the use of the order of operations</p> <p>Add and subtract fractions with related denominators using flexible and efficient strategies based on knowledge of equivalence</p> <p>Determine a familiar fraction, decimal or percentage of a whole number</p>	<p>Weeks 1–4</p> <p>Facilitate practice of adding and subtracting fractions in authentic contexts. One way to do this is through using the ‘How did you do it?’ strategy, where students discuss strategies used to solve problems. Provide one or two examples of a fraction addition or subtraction problem involving everyday situations and using related denominators among halves, quarters and eighths; thirds, sixths and twelfths; halves, fifths and tenths.</p> <p>Provide students with frequent opportunities to identify and manipulate mixed numeral fractions. One activity could be to ask students to repeatedly add a mixed numeral fraction, then discussing results and strategies.</p> <p>Facilitate practice of finding fractions and percentages of quantities and relating to decimals as fractions.</p> <p>Facilitate opportunities for students to link fractions, percentages and decimals using knowledge of equivalent fractions, e.g. $70\% = 0.7 = \frac{70}{100} = \frac{7}{10}$. Ensure understanding that finding a ‘fraction of’ a whole is interchangeable with finding a decimal or percentage of a whole. Focus students on using representations that lead to the simplest calculation strategy.</p> <p>Facilitate practice of ordering common fractions and mixed numerals on number lines.</p> <p>Provide students with opportunities to solve problems using order of operations knowledge. For example, provide examples of solved problems and discuss why the found answers are correct or incorrect.</p>

Western Australian Curriculum content	Term 4 Daily practice activities
<p>Number and algebra</p> <p>Calculating with number Choose and use flexible and efficient strategies to calculate with whole numbers, involving any of the four operations, and explore the use of the order of operations</p> <p>Measurement and geometry</p> <p>Two-dimensional space and structures Investigate angles in a right angle, on a straight line, angles at a point and vertically opposite angles, to determine unknown angles and explain reasoning</p>	<p>Weeks 5–8 Facilitate practice in recognising and manipulating angles, with students using reasoning to calculate unknown angles and justify decisions.</p> <p>Facilitate practice in representing problems and calculation strategies for all four operations using equations and diagrams, including with whole numbers, decimals and fractions.</p>

Term 4 Week 1

Western Australian Curriculum content	Teaching and learning intentions	Learning experiences
<p>Number and algebra</p> <p>Financial mathematics Develop plans for savings goals, predict expenses and identify that saving money with a bank attracts interest</p> <p>Probability and statistics</p> <p>Statistics In a real-world context involving continuous and discrete numerical data, use the following process</p> <ol style="list-style-type: none"> analyse the situation to pose a question choose the most appropriate way to collect data to ensure accuracy and consistency, and make choices to represent data, including line graphs and side-by-side column graphs interpret and communicate findings in terms of the context and describe reasons for variation 	<p>Learning intention To plan an event to achieve a savings goal</p> <p>Focus questions</p> <ul style="list-style-type: none"> What expenses might you have while saving towards your goal? What costs might you incur when organising a fundraising event? How much would each group need to raise to meet the goal? How will you use a spreadsheet to help plan your activity? How can progress be monitored when the fundraising event is taking place? What does it mean when a bank pays interest on savings? <p>Support notes Fundraising activities could include a cake stall, drink stall, craft stall or sport/carnival or a craft stall. An end of year gift could be substituted for an end of year party.</p>	<p>Learning experience 1</p> <ul style="list-style-type: none"> Pose the question: 'Why do we save money?' Ask students to discuss with a partner and share their ideas with the class. Ask students to imagine they were given \$50 today and to write down what they would do with the money. Share responses and review the concept of needs and wants. Review what a goal is and why people have savings goals. Students select an item that they want to buy and research the cost. Give students an amount of money that they would earn each week and ask them to calculate how long it would take to reach the goal. Review saving strategies and factors that might affect their savings. <p>Learning experience 2</p> <ul style="list-style-type: none"> Explain to students that they are going to plan a fundraising day to raise money to purchase an end of year gift for the school. Discuss realistic goals regarding amounts of money they would be able to raise. Establish that gathering data to inform planning of events and purchasing decisions is important and discuss reasons why. Place students in small groups and allocate a data collection responsibility – either to collect data about

Western Australian Curriculum content	Teaching and learning intentions	Learning experiences
		<p>the types of activities for the fundraising day or about the gift to be purchased at the end.</p> <ul style="list-style-type: none"> Groups will need to refine a question to collect data from an allocated group within the school. Students will need to consider how to frame the question so that it is suitable for the intended audience (teachers or younger/older students). Students collect and represent data in an appropriate graph and present findings to the class. As a class, decide on the activities for the fundraising event and the gift based on the data collected. <p>Learning experience 3</p> <ul style="list-style-type: none"> In small groups, students use a spreadsheet to plan their fundraising activity. This may include a list of the resources and predicted costs to set up their activity. <p>As a class, set saving goals for the different activities based on the cost of the gift and predicted popularity of the activity.</p> <p>Using the savings goal, students decide on the intended cost of their product/activity.</p> <p>Challenge students to make calculations to predict how much money they could raise based on different numbers of people paying for the product/activity.</p>

Western Australian Curriculum content	Teaching and learning intentions	Learning experiences
		<p>Learning experience 4</p> <ul style="list-style-type: none"> Students hold the event or events (where appropriate for the class), total the money collected and update their spreadsheet to reflect the income. <p>Review the different savings goals for each group and the amount of money raised.</p> <p>Discuss the benefits of placing the money raised within a bank and the concept of interest.</p>

Term 4 Week 2

Western Australian Curriculum content	Teaching and learning intentions	Learning experiences
<p>Number and algebra</p> <p>Calculating with number Choose and use flexible and efficient strategies to calculate with whole numbers, involving any of the four operations, and explore the use of the order of operations</p> <p>Add and subtract decimals to two decimal places, using flexible and efficient strategies</p> <p>Multiply decimals by whole numbers and multiply and divide decimals by powers of 10, using flexible and efficient strategies</p> <p>Measurement and geometry</p> <p>Two-dimensional space and structures Convert between units of length by connecting metric units to the decimal system and extend to units of mass and capacity</p>	<p>Learning intention To convert between units of mass and apply this knowledge to solve problems</p> <p>Focus questions</p> <ul style="list-style-type: none"> How does understanding prefixes help you understand and compare the size of different units? What patterns do we notice when converting between different metric units across length and mass? How is the metric system connected to our decimal number system? How can we use a scale to accurately find the mass of different food packaging? Why might it be necessary to carry out some conversions between units? <p>Support notes Food packaging contains a net measurement, which is the weight of the contents without the packaging. Gross weight is the total weight of an item (food) and its packaging.</p> <p>Suggested assessment point Learning experience 4 provides the opportunity to observe and record students' fluency in choosing operations and using equations to represent and solve a range of self-generated problems.</p>	<p>Learning experience 1</p> <ul style="list-style-type: none"> Review the units of measurement for mass and the meaning of the prefixes. Link to the work done on length in Term 1, Week 7. Review the place value relationships between milligrams, grams, kilograms and tonnes. Assist students to construct equality statements between various units, e.g. 340 milligrams = 0.34 grams. <p>Learning experience 2</p> <ul style="list-style-type: none"> Review how to convert between different units of mass. Present students with correct and incorrect conversions and discuss as a class. Place students in small groups and set up a team challenge where students complete three tasks, answering as many questions as they can in a given timeframe. <ul style="list-style-type: none"> Task 1 – groups complete simple conversions For example: 3.2 kg = ____ g. Task 2 – groups place equality and inequality symbols between two measurements For example: six tonnes ____ 7800 kg. Task 3 – groups apply conversions to real-world contexts, e.g. A truck weighs 6.5 tonnes and a car weighs 1550 kg. How much more does a truck weigh? Review all questions and discuss any challenging questions.

Western Australian Curriculum content	Teaching and learning intentions	Learning experiences
		<p>Learning experience 3</p> <ul style="list-style-type: none"> • Provide students with a variety of sealed packaged food. Ensure each item is labelled with its mass. • Discuss how students could determine the mass of the packaging without removing the contents, and establish the meaning of 'net' and 'gross' weights. • Establish that students may need to convert between units so calculations can be carried out correctly. • Provide students with electronic scales that are accurate to 0.1 of a gram. In pairs, students weigh the packaged food and carry out calculations to find the mass of the packaging. • Students record the mass of the contents and the mass of the packaging in both grams and kilograms. • Students discuss results and justify strategies. Ask students to justify how they decided which operation would be needed to make the calculations. • Extend the task by asking students to calculate the amount of packaging used for multipacks of food compared to the amount of packaging used for the same amount of food in a single package. For example, a pack of individual chips and a large share bag. <p>Learning experience 4</p> <ul style="list-style-type: none"> • Show students the following article and discuss shrinkflation: CHOICE – Is this what 25 years of shrinkflation looks like? https://www.choice.com.au/shopping/packaging-labelling-and-advertising/packaging/articles/shrinkflation-over-the-decades.

Western Australian Curriculum content	Teaching and learning intentions	Learning experiences
		<ul style="list-style-type: none"> • Discuss what has changed and use the article to create word problems to calculate the amount in grams that the items have reduced by. Model to students how to use the information on the food packaging from the previous learning experience to create word problems. This could include the need for converting between units. • In pairs, students write word problems and solve them. After students have constructed three problems, direct them to swap with another pair. Ask them to write a number sentence to represent the problem, then use a mental or written strategy, or a calculator, to solve the problem. Students compare and justify their representations and solutions with the authors of the problems. • As an extension activity, create a modelling situation where students calculate the percentage reduction for one item before it was shrunk to its most recent and smaller version. Challenge students to compare the net weight with the gross weight.

Term 4 Week 3

Western Australian Curriculum content	Teaching and learning intentions	Learning experiences
<p>Number and algebra</p> <p>Calculating with number Multiply decimals by whole numbers and multiply and divide decimals by powers of 10, using flexible and efficient strategies</p> <p>Measurement and geometry</p> <p>Two-dimensional space and structures Convert between units of length by connecting metric units to the decimal system and extend to units of mass and capacity</p> <p>Modelling with measurement and geometry In real-world situations involving transformation of two-dimensional shapes, rectangular prisms, pyramids, Cartesian planes, measuring and converting metric units for length, mass and capacity, determining volume and area in metric units or determining the duration of events and journeys, use the following process</p> <ol style="list-style-type: none"> analyse the situation and identify relevant information mathematically represent the situation to reach a solution interpret and communicate findings in the context, exploring and justifying decisions 	<p>Learning intention To convert between units of capacity and apply this knowledge to solve problems</p> <p>Focus questions</p> <ul style="list-style-type: none"> What relationships have you found when converting between units of length, mass and capacity? How do you know if you need to multiply or divide when converting between units? Why is understanding the decimal system useful when measuring capacity in real-life? <p>Support notes If allowing students to make their own smoothies, consider the medical needs and allergies of all students.</p> <p>For real-world situations relating to capacity, the Water Corporation provides useful statistics:</p> <ul style="list-style-type: none"> Water Corporation – Home page https://www.watercorporation.com.au/ Water Corporation – Perth's Groundwater Replenishment Scheme notches recharge record https://www.watercorporation.com.au/about-us/media-releases/2025/march/perths-groundwater-replenishment-scheme-notches-recharge-record. 	<p>Learning experience 1</p> <ul style="list-style-type: none"> Establish the units of measurement for capacity and the meaning of the prefixes for millilitres, litres, kilolitres and megalitres. Discuss the size of the units and situations when they would be used. Using place value, review how to convert between the different units, linking to Term 4, Week 2 conversions for mass. Provide students with capacity measurements to convert to different units. <p>Learning experience 2</p> <ul style="list-style-type: none"> Review how to convert between different units of measure for capacity. Provide students with different situations to practise conversions with a partner. For example: A 50-metre Olympic swimming pool holds 2.5 megalitres of water. How many litres is this? Other real-world contexts include fire trucks, water tanks, juice bottling factories or rainfall. Ask students to show the conversions made to answer the problems. Challenge students to write conversion problems for classmates to solve.

Western Australian Curriculum content	Teaching and learning intentions	Learning experiences
	<p>Suggested assessment point</p> <p>Students could write a recipe for their own smoothie creation, including conversions of units, examples of calculations and reasoning for why they have converted units.</p>	<p>Learning experience 3</p> <ul style="list-style-type: none"> • Provide students with the recipe for a smoothie that serves two people, with a mix of units used, including grams, kilograms, millilitres and litres. • Ask students to convert the measurements to the same units of weight and capacity. Discuss the conversions that were made. • Ask students to work in pairs and provide the measurements for the smoothie recipe if it was made for different numbers of people. They should record all amounts in both millilitres and litres or grams and kilograms. <p>Learning experience 4</p> <ul style="list-style-type: none"> • Students work in pairs to design their own smoothie recipe for a family of five. Ask students to complete research to gain ideas on ingredients used in different smoothies. • The students will need to make decisions on ingredients and quantities, and provide accurate costings for the ingredients. • If appropriate, students could make and test their smoothies. • Challenge students to find costings from two different shops to show where the ingredients could be sourced for the best value. • The task could be extended to include calculating the ingredients and cost per person, per day or the ingredients and cost per person for a week.

Term 4 Week 4

Western Australian Curriculum content	Teaching and learning intentions	Learning experiences
<p>Measurement and geometry</p> <p>Three-dimensional space and structures Visualise, sketch and construct three-dimensional objects, including prisms and pyramids</p> <p>Describe and test a sequence of steps to determine the volume of rectangular prisms based on dimensions</p> <p>Modelling with measurement and geometry In real-world situations involving transformation of two-dimensional shapes, rectangular prisms, pyramids, Cartesian planes, measuring and converting metric units for length, mass and capacity, determining volume and area in metric units or determining the duration of events and journeys, use the following process</p> <ol style="list-style-type: none"> analyse the situation and identify relevant information mathematically represent the situation to reach a solution interpret and communicate findings in the context, exploring and justifying decisions 	<p>Learning intention To describe a sequence of steps to determine the volume of rectangular prisms and test using a real-world situation</p> <p>Focus questions</p> <ul style="list-style-type: none"> What dimensions could be recorded from the rectangular prism? What is the relationship between the dimensions and the volume? How can the layers of cubes in a rectangular prism be used to find the volume? How do you know you have found all the ways to create a rectangular prism with 24 cubes? <p>Support notes Teachers should not guide students to use a formula or even present a formula; this is introduced in Year 7. Students who do know or figure out the formula should explore if this same formula works for unconventional 3D objects made from cubes.</p>	<p>Learning experience 1</p> <ul style="list-style-type: none"> Direct students to build a rectangular prism using one-centimetre blocks. Ask students to record information or dimensions of the prism. This could include the number of cubes per layer, height, length or number of cubes on faces. Discuss the meaning of ‘volume’ and how it differs from capacity. Ask students to discuss with classmates and devise ways they can work out the volume of the rectangular prism based on the information they recorded. As a class, students share ideas and test to see if these ideas work on the prism they have constructed. <p>Learning experience 2</p> <ul style="list-style-type: none"> Provide students with diagrams of rectangular prisms made from cubes. Students set up a table and record the number of cubes in a layer, the number of layers and the volume. Students use the table to identify patterns in the information recorded and establish that the number of cubes in a layer multiplied by the number of layers gives the volume. Ask students to calculate the volume if the number of layers were doubled or tripled. <p>Learning experience 3</p> <ul style="list-style-type: none"> Ask students to imagine they have been given 24 cubes and must construct all the different rectangular prisms

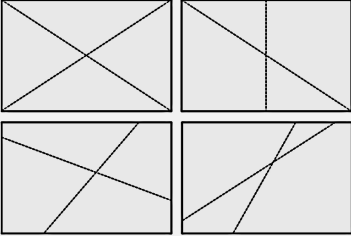
Western Australian Curriculum content	Teaching and learning intentions	Learning experiences
		<p>they can make with a volume of 24cm^3. Encourage students to predict how many rectangular prisms they think they could make. Discuss reasons behind their predictions.</p> <ul style="list-style-type: none"> • Ask students to draw diagrams of the different rectangular prisms and label their dimensions. In a table, they record the number of cubes in each layer, the number of layers, the length and width to show the different prism variations. • Review students' findings. Make connections between the three dimensions of a rectangular prism; height, width and length. Relate the three dimensions to why the superscript of 3 is used to denote cubed numbers. <p>Learning experience 4</p> <ul style="list-style-type: none"> • Challenge students to use their knowledge of volume to solve a real-world problem. For example: A local cinema wants a new child-friendly popcorn box for their snack bar. The box must be a rectangular prism with a volume of 1400 cm^3 with a lid or flap that can open and close. • Provide students with centimetre cubes and grid paper. Encourage them to use these to explore various dimensions and reason why they chose these. • Students measure and draw out the net and then construct.

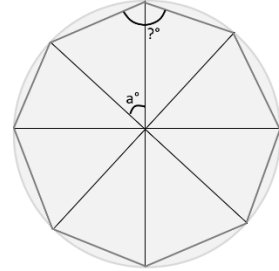
Term 4 Week 5

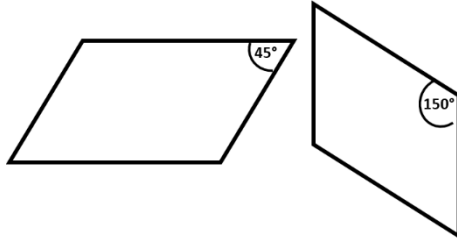
Western Australian Curriculum content	Teaching and learning intentions	Learning experiences
<p>Number and algebra</p> <p>Calculating with number Choose and use flexible and efficient strategies to calculate with whole numbers, involving any of the four operations, and explore the use of the order of operations</p> <p>Add and subtract fractions with related denominators using flexible and efficient strategies based on knowledge of equivalence</p> <p>Modelling with number In real-world situations involving whole numbers, order of operations and fractions with the same denominator, use the following process</p> <ol style="list-style-type: none"> analyse the situation and identify relevant information mathematically represent the situation, including using equations to reach a solution interpret and communicate findings in the context, exploring and justifying decisions 	<p>Learning intention To apply knowledge of fractions and whole numbers to solve real-world situations</p> <p>Focus questions</p> <ul style="list-style-type: none"> How do you know that your fractions total a whole? Which operation/s did you use to solve your problem and why? How did you use your knowledge of measurement conversions to solve the problem? 	<p>Learning experience 1 and 2</p> <ul style="list-style-type: none"> Present students with a problem that involves fractions. For example: The school gardener needs help with designing the layout of a garden bed. The garden bed is rectangular, measuring $2\text{ m} \times 4\text{ m}$, and needs to be filled with a range of native plants. The gardener wants sections of the garden bed to be different sizes to cater for the needs of different types of plants. Use drawings and fractions to show a number of ways the gardener could divide the garden bed to meet their needs. Think carefully about how you will present your findings to the gardener. Discuss the gardener's requirements to ensure students understand the task. Students will need to draw out the rectangular garden bed, divide it in different ways and record the fractions that each part represents. Ask students to present their ideas to the gardener, explaining how they know the fractions used will equal one whole. The task could be extended by asking students to record the measurements and area of each section, including pricing the costs of the plants.

Western Australian Curriculum content	Teaching and learning intentions	Learning experiences
		<p>Learning experience 3 and 4</p> <ul style="list-style-type: none"> • Provide opportunities for students to read, represent and solve problems involving numbers into the millions and beyond. • Give students problems that involve one million and require conversion of measurement units and operational understanding. Examples of problems include: <ul style="list-style-type: none"> ▪ How long would it take to sharpen one million pencils? ▪ How much water would fill one million cups? ▪ How long would a line of one million dollar coins be? • Encourage students to discuss their strategies with a partner or group to decide on how to convert between units of measurement and the operations required to solve the problem. Students communicate findings and justify answers.

Term 4 Week 6

Western Australian Curriculum content	Teaching and learning intentions	Learning experiences
<p>Measurement and geometry</p> <p>Two-dimensional space and structures</p> <p>Investigate angles in a right angle, on a straight line, angles at a point and vertically opposite angles, to determine unknown angles and explain reasoning</p>	<p>Learning intention</p> <p>To use knowledge of angles on a straight line, angles at a point and vertically opposite angles to determine unknown angles</p> <p>Focus questions</p> <p>Learning experience 1</p> <ul style="list-style-type: none"> How could knowing a straight angle equals 180° help you work out the remaining unknown angles after measuring just one of the angles? What do you already know about angles, circles and tessellating polygons that can help you with this problem? How does the number of sides you want on your polygon help you work out the size of the angles you are going to be measuring around the centre of the circle? How could you work out the size of the polygon's angles from the angles you measured at the centre of the circle? What are the angle features of triangles and straight lines that help you verify the size of the angles around the perimeter of the polygon? How could extending the sides of the parallelogram assist you to prove the size of the unknown angles? How can you be certain that the opposite angles are exactly the same size? 	<p>Learning experience 1</p> <ul style="list-style-type: none"> Fold a sheet of paper in half vertically and then in half again horizontally. Ask students what the total of the angles measure around the point where two lines intersect.  <ul style="list-style-type: none"> Provide students with paper. Ask them to make two diagonal folds, measure the angles formed, and record their angles in a maths workbook (or similar). Students write their name on their folded sheet, then swap their sheet with a peer. They measure the angles of their peer's sheet and record in their workbooks. Continue to swap until students have recorded four to five versions. Ask students to make two straight, intersecting lines on a new sheet of paper by folding, then measure just one of the four angles formed. Challenge them to use what they have previously discovered to deduce the size of the other three angles without using a protractor. Students generalise what they have found out to formulate rules for finding unknown angles when

Western Australian Curriculum content	Teaching and learning intentions	Learning experiences
	<p>Support notes</p> <p>When asking students to justify their problem-solving using reasoned arguments, teachers should expect arguments to involve knowledge of angles, angle relationships, right angles and angles of a circle.</p> <p>Instructions on how to construct a polygon inside a circle can be found at:</p> <p>Mathleaks – Polygons Inscribed in a Circle https://mathleaks.com/study/polygons_inscribed_in_a_circle#slide-5.</p> <p>Suggested assessment point</p> <p>Learning experience 4 can be used as a formative assessment of students' ability to investigate and determine unknown angles in different situations and explain their reasoning.</p>	<p>straight lines intersect. Focus students' thinking by asking what patterns can be seen in the relationship between the four angles they are measuring.</p> <ul style="list-style-type: none"> Direct students to cut along the folds and rearrange the pieces to show which pairs of angles sum to 180° and that the opposite angles are equal in size. <p>Learning experience 2</p> <ul style="list-style-type: none"> Model to students how to accurately construct a polygon inside a circle using a compass, ruler, protractor and calculator.  <ul style="list-style-type: none"> When the polygon is complete, ask students to work out the size of the interior angle at each corner of the polygon without using a protractor. In pairs, students discuss the strategies they used to find the unknown angles. They justify why their strategies and results must be correct.

Western Australian Curriculum content	Teaching and learning intentions	Learning experiences
		<p>Learning experience 3</p> <ul style="list-style-type: none"> Provide students with diagrams of a number of parallelograms with the interior angle at just one of the corners given.  <ul style="list-style-type: none"> Challenge students to determine the unknown interior angles of the parallelograms without using their protractor. Extending a side may help students use their knowledge of 180°. Ask students to share their calculations with a peer, along with the reasoning they have used to justify their answers. Challenge students to draw some different-shaped quadrilaterals to try to determine the minimum number of interior angles they need to calculate all the unknown angles. <p>Learning experience 4</p> <ul style="list-style-type: none"> Provide students with Assessment task 2: Many angles (Appendix C).

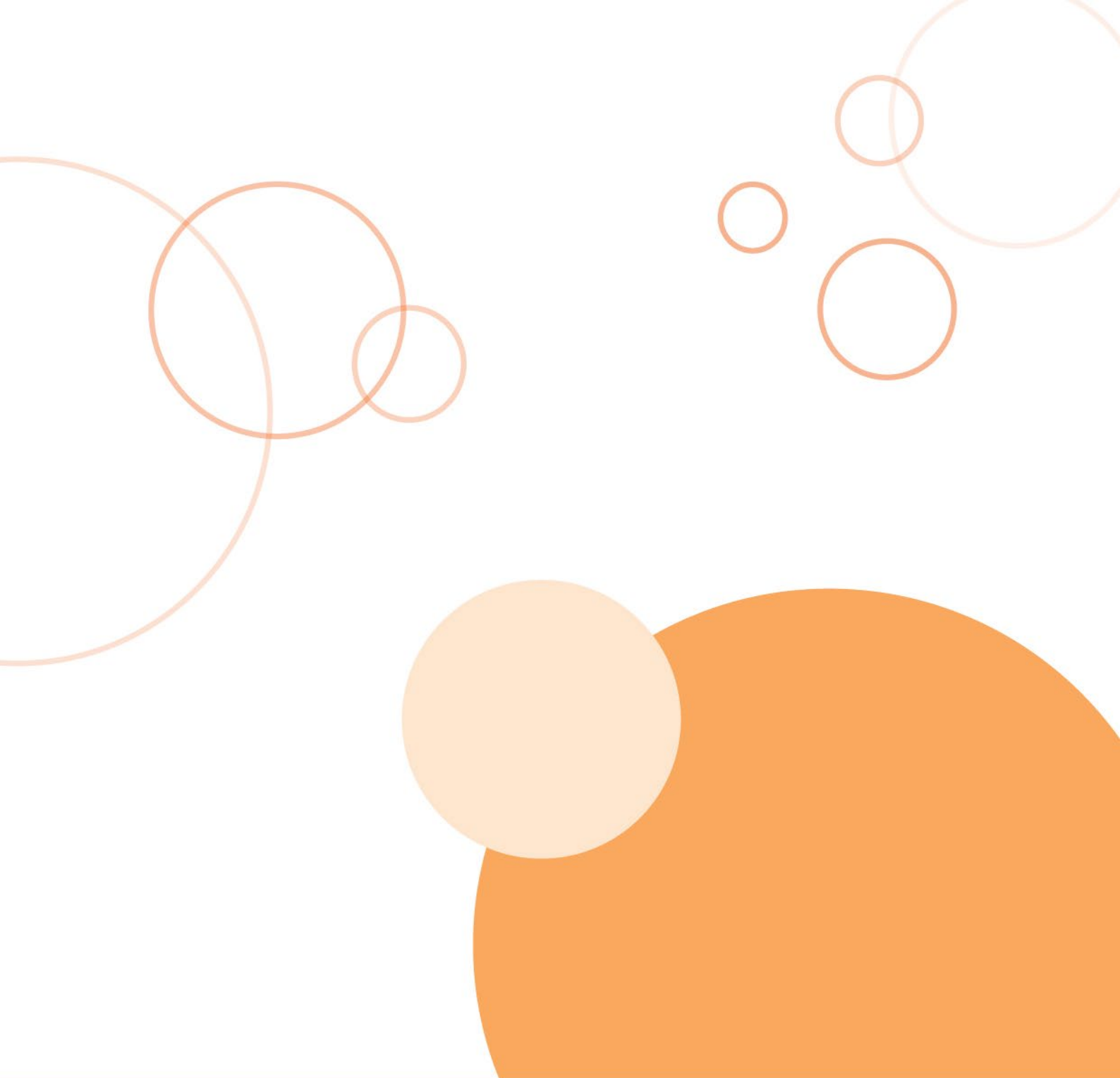
Term 4 Week 7

Western Australian Curriculum content	Teaching and learning intentions	Learning experiences
<p>Probability and statistics</p> <p>Statistics</p> <p>Describe and interpret a range of displays for real-life numerical data, including side-by-side column graphs, using mode, range and shape</p> <p>Describe how the features of real-life data displays may influence an audience</p> <p>In a real-world context involving continuous and discrete numerical data, use the following process</p> <ol style="list-style-type: none"> analyse the situation to pose a question choose the most appropriate way to collect data to ensure accuracy and consistency, and make choices to represent data, including line graphs and side-by-side column graphs interpret and communicate findings in terms of the context and describe reasons for variation 	<p>Learning intention</p> <p>To plan and conduct a data investigation, choose appropriate data displays and interpret findings</p> <p>Focus questions</p> <ul style="list-style-type: none"> How can we describe the shape of a data display? What is the most accurate and consistent way to collect this data? What does the data tell us about the question? 	<p>Learning experience 1</p> <ul style="list-style-type: none"> Explain to students that they are going to plan and complete a data investigation using player profiles from a chosen sport. Netball has been chosen as an example for the following four learning experiences. Model using the player profiles from netball to review player statistics: Netball Australia – Diamonds Squad https://netball.com.au/diamonds/squad. Select a player and a relevant competition, and discuss ideas that could be made into questions to investigate. Model writing questions. Direct students to the Suncorp Super Netball teams: Netball Australia – Teams https://netball.com.au/supernetball/teams. Students examine team or player statistics with a partner and pose a question they could investigate. For example, ‘Which player has scored the most goals in a season when playing away from home?’ Students share their chosen questions and, where needed, discuss refinements that could be made to the questions. <p>Learning experiences 2 and 3</p> <ul style="list-style-type: none"> Review with the class appropriate ways to collect data and suitable types of graphs for different situations.

Western Australian Curriculum content	Teaching and learning intentions	Learning experiences
		<ul style="list-style-type: none"> Students collect data online from the netball team or player profiles, and record in a table. They represent the data in an appropriate graph using a computer program. Students describe their findings in relation to their question, including the mode, range and shape of the graph. <p>Learning experience 4</p> <ul style="list-style-type: none"> Students pose a question that can be answered using the statistics found on this webpage: Australian Institute of Health and Welfare (AIHW) – Sports injury in Australia: Netball https://www.aihw.gov.au/reports/sports-injury/sports-injury-in-australia/contents/featured-sports/netball. Students refine their question, such as, ‘What are the differences in the number of sports injuries for different sports played in Australia?’ Students choose an appropriate data display from the AIHW webpage and interpret it to answer the question and justify using the data. Students communicate their findings in terms of the context of the data reviewed.

Term 4 Week 8

Western Australian Curriculum content	Teaching and learning intentions	Learning experiences
<p>Measurement and geometry</p> <p>Non-spatial measurement Use timetables and itineraries in 12- and 24-hour time systems to determine the duration of events and journeys</p> <p>Modelling with measurement and geometry In real-world situations involving transformation of two-dimensional shapes, rectangular prisms, pyramids, Cartesian planes, measuring and converting metric units for length, mass and capacity, determining volume and area in metric units or determining the duration of events and journeys, use the following process</p> <ol style="list-style-type: none"> analyse the situation and identify relevant information mathematically represent the situation to reach a solution interpret and communicate findings in the context, exploring and justifying decisions 	<p>Learning intention To create an itinerary for a real-world situation using knowledge of 12- and 24-hour time systems and durations of events and journeys</p> <p>Focus questions</p> <ul style="list-style-type: none"> What information will you need to provide for the family on the itinerary? What public transport options are available around Perth? What destinations around Perth are accessible by public transport and good for a family? Over the seven days, how can you balance big days out with days that are more relaxing? <p>Support notes Teachers may need to give students access to tourist maps or bookmarked websites with access to maps or timetables they can use. Teachers may need to model how to use JourneyPlanner, available on the Transperth website. This task could be extended to include the cost of activities and public transport.</p> <p>Suggested assessment point The presentation could be used as a formative assessment.</p>	<p>Learning experience 1</p> <ul style="list-style-type: none"> Explain to students that they are going to plan an itinerary for a family of four that are visiting Perth for a week in the January holidays. The family will be staying in the city and only have access to public transport. They have never visited Perth before. The family want to do a range of activities suitable for adults and children but also consider the weather at that time of the year. Discuss the task with students and establish the resources available to students. Place students in pairs to discuss the task and begin planning. Students will need to consider what information will be required in the itinerary to meet the needs of the family and how they are going to present the information. <p>Learning experiences 2 and 3</p> <ul style="list-style-type: none"> In pairs, students use the lessons to complete the task, finding all the relevant information and presenting it in an appropriate way. <p>Learning experience 4</p> <ul style="list-style-type: none"> Students swap their itinerary with another pair, evaluating by providing feedback and any suggestions for improvement. Students review their own itinerary using the feedback.



Appendix A

Resources

Year 6 Overview of Mathematics curriculum content

The following table identifies the terms and weeks when each Year 6 content description is included in the exemplar. 'D' refers to the Daily practice activities.

Year 6 content description		Term			
		1	2	3	4
Number and algebra					
Understanding number	Investigate the use of positive and negative integers to represent everyday situations. Read, write and order integers on a number line	D,1		6	
	Represent and explain the multiplicative place value relationship between places in any number, including decimals		D,5		
	Explore, identify and represent square, prime and composite numbers in arrays and explain reasoning		2		
	Order common fractions with the same and related denominators, including mixed numerals, using diagrams and number lines			3	D
	Connect commonly used percentages, including 10%, 25% and 50%, to fractions and decimals, including on a number line	D,2	D	D,2,8	D
Understanding equalities and inequalities	Complete, check and construct statements of equality and inequality involving the four operations, including the use of brackets and order of operations, and explain reasoning	1		7	
Patterns and relationships	Create and represent increasing or decreasing patterns using concrete materials and numbers. Use words to generalise rules that relate each element of a pattern to its position		1		

Year 6 content description		Term			
		1	2	3	4
Calculating with number	Choose and use flexible and efficient strategies to calculate with whole numbers, involving any of the four operations, and explore the use of the order of operations	D,3,4,6	3,4	D,1	D,2,5
	Add and subtract fractions with related denominators using flexible and efficient strategies based on knowledge of equivalence		D	4	D,5
	Add and subtract decimals to two decimal places, using flexible and efficient strategies	5,6	D	1	2
	Multiply decimals by whole numbers and multiply and divide decimals by powers of 10, using flexible and efficient strategies	7	D,5	D	2,3
	Determine a familiar fraction, decimal or percentage of a whole number		D	D,2	D
	Use estimation and rounding to make reasonable evaluations and justify results	D,3,4,5,6	3,4	1	
Financial mathematics	Develop plans for savings goals, predict expenses and identify that saving money with a bank attracts interest				1
Modelling with number	In real-world situations involving whole numbers, order of operations and fractions with the same denominator, use the following process I. analyse the situation and identify relevant information II. mathematically represent the situation, including using equations to reach a solution III. interpret and communicate findings in the context, exploring and justifying decisions	6	4	1	5

Year 6 content description		Term			
		1	2	3	4
Measurement and geometry					
Two-dimensional space and structures	Explore, visualise and describe translations, reflections or rotations of two-dimensional shapes			5	
	Convert between units of length by connecting metric units to the decimal system and extend to units of mass and capacity	7			2,3
	Describe and test a sequence of steps to determine the area of rectangles based on dimensions		6		
	Investigate angles in a right angle, on a straight line, angles at a point and vertically opposite angles, to determine unknown angles and explain reasoning			D,5	D,6
	Explore the Cartesian plane as the intersection of two number lines at zero, using the coordinate system to locate points in all four quadrants			6	
Three-dimensional space and structures	Visualise, sketch and construct three-dimensional objects, including prisms and pyramids		7		4
	Describe and test a sequence of steps to determine the volume of rectangular prisms based on dimensions				4
Non-spatial measurement	Use timetables and itineraries in 12- and 24-hour time systems to determine the duration of events and journeys	8			8
Modelling with measurement and geometry	<p>In real-world situations involving transformation of two-dimensional shapes, rectangular prisms, pyramids, Cartesian planes, measuring and converting metric units for length, mass and capacity, determining volume and area in metric units or determining the duration of events and journeys, use the following process</p> <p>I. analyse the situation and identify relevant information</p> <p>II. mathematically represent the situation to reach a solution</p> <p>III. interpret and communicate findings in the context, exploring and justifying decisions</p>	8			3,4,8

Year 6 content description		Term			
		1	2	3	4
Probability and statistics					
Probability	Order everyday chance events and phrases on a scale from 0 to 1, where 0 represents an event that is certain not to happen (impossible) and 1 represents an event that is certain to happen			8	
	Conduct repeated chance experiments and simulations with equally likely or unequally likely outcomes, including with the use of digital tools, for an increasing number of trials. Compare expected and observed frequencies in terms of variation as the number of trials increase			8	
Statistics	Describe and interpret a range of displays for real-life numerical data, including side-by-side column graphs, using mode, range and shape		8		7
	Describe how the features of real-life data displays may influence an audience		8		7
	<p>In a real-world context involving continuous and discrete numerical data, use the following process</p> <ol style="list-style-type: none"> analyse the situation to pose a question choose the most appropriate way to collect data to ensure accuracy and consistency, and make choices to represent data, including line graphs and side-by-side column graphs interpret and communicate findings in terms of the context and describe reasons for variation 				1,7

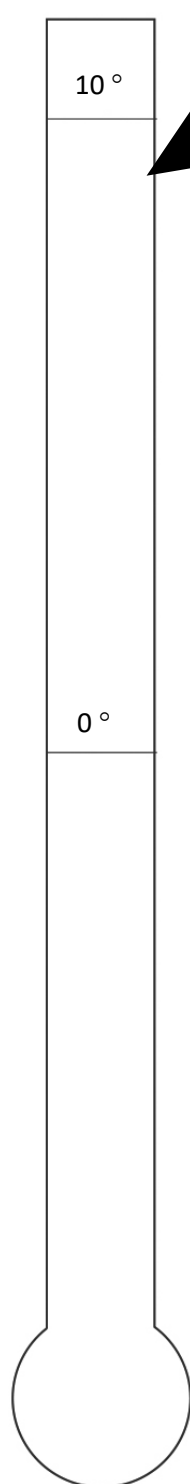
Resources

Week	Resource
Appendix A (for Term 1 Week 1)	Department of Education Western Australia. <i>Knowing What They Know: Understanding Students' Mathematical Ideas in Years 6 to 9</i> , pp. 72–73, Task 13 – Thermometer.
Term 1 Week 8	Transwa. <i>Transwa Train Timetables</i> . https://www.transwa.wa.gov.au/tickets-times/train-timetables .
Term 2 Week 7	National Council of Teachers of Mathematics: Illuminations. <i>Isometric Drawing Tool</i> . https://www.nctm.org/Classroom-Resources/Illuminations/Interactives/Isometric-Drawing-Tool/
Term 2 Week 8	Australian Bureau of Statistics. <i>Statistics</i> . https://www.abs.gov.au/statistics
Term 2 Week 8	Australian Association of Mathematics Teachers: Top Drawer Teachers. <i>Misleading scales</i> . https://topdrawer.aamt.edu.au/Statistics/Misunderstandings/Misleading-graphs/Misleading-scales
Term 3 Week 3	Education Services Australia & Scootle. <i>Fraction fiddle: hit the apple</i> . https://www.scootle.edu.au/ec/viewing/L2804/index.html#
Term 3 Week 6	Math Antics. <i>Algebra Basics: Graphing On The Coordinate Plane</i> . https://www.youtube.com/watch?v=9Uc62CuQjc4
Term 3 Week 6	Victoria State Government, Victorian Department of Education & Arc. <i>Plotting points on a Cartesian plane</i> . https://arc.educationapps.vic.gov.au/learning/sites/mcc/VCMNA255/Plotting-points-on-the-Cartesian-plane .
Term 4 Week 2	CHOICE. <i>Is this what 25 years of shrinkflation looks like?</i> https://www.choice.com.au/shopping/packaging-labelling-and-advertising/packaging/articles/shrinkflation-over-the-decades
Term 4 Week 3	Water Corporation. <i>Home page</i> . https://www.watercorporation.com.au/
Term 4 Week 3	Water Corporation. <i>Perth's Groundwater Replenishment Scheme notches recharge record</i> . https://www.watercorporation.com.au/about-us/media-releases/2025/march/perths-groundwater-replenishment-scheme-notches-recharge-record
Term 4 Week 6	Mathleaks. <i>Polygons Inscribed in a Circle</i> . https://mathleaks.com/study/polygons-inscribed-in-a-circle#slide-5
Term 4 Week 7	Netball Australia. <i>Diamonds Squad</i> . https://netball.com.au/diamonds/squad
Term 4 Week 7	Netball Australia. <i>Teams</i> . https://netball.com.au/supernetball/teams
Term 4 Week 7	Australian Institute of Health and Welfare. <i>Sports injury in Australia: Netball</i> . https://www.aihw.gov.au/reports/sports-injury/sports-injury-in-australia/contents/featured-sports/netball

Diagnostic task: Thermometer

Term 1 Week 1

Name _____ Year _____ Class _____ Date _____



This is part of a thermometer with zero degrees and ten degrees marked on it.

Katie checked the temperature one night and found it was eight degrees.

- **Mark eight degrees on the thermometer.**

How did you work out where to put it and what to write?

By the morning, the temperature had fallen by twelve degrees from where it had been the night before.

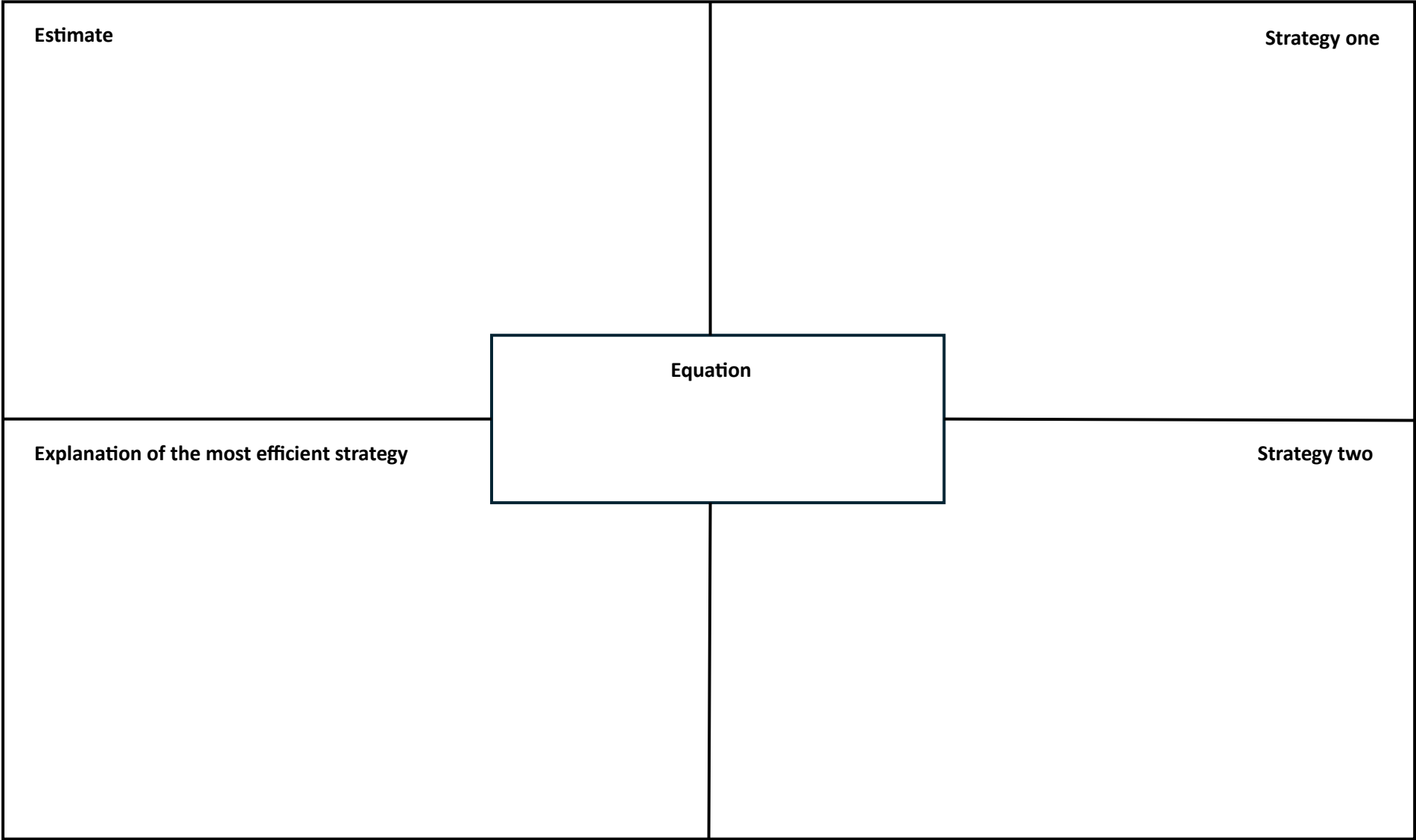
- **Mark the new temperature on the thermometer.**

How did you work out where to put it and what to write?

(Department of Education WA, 2002)

Think board

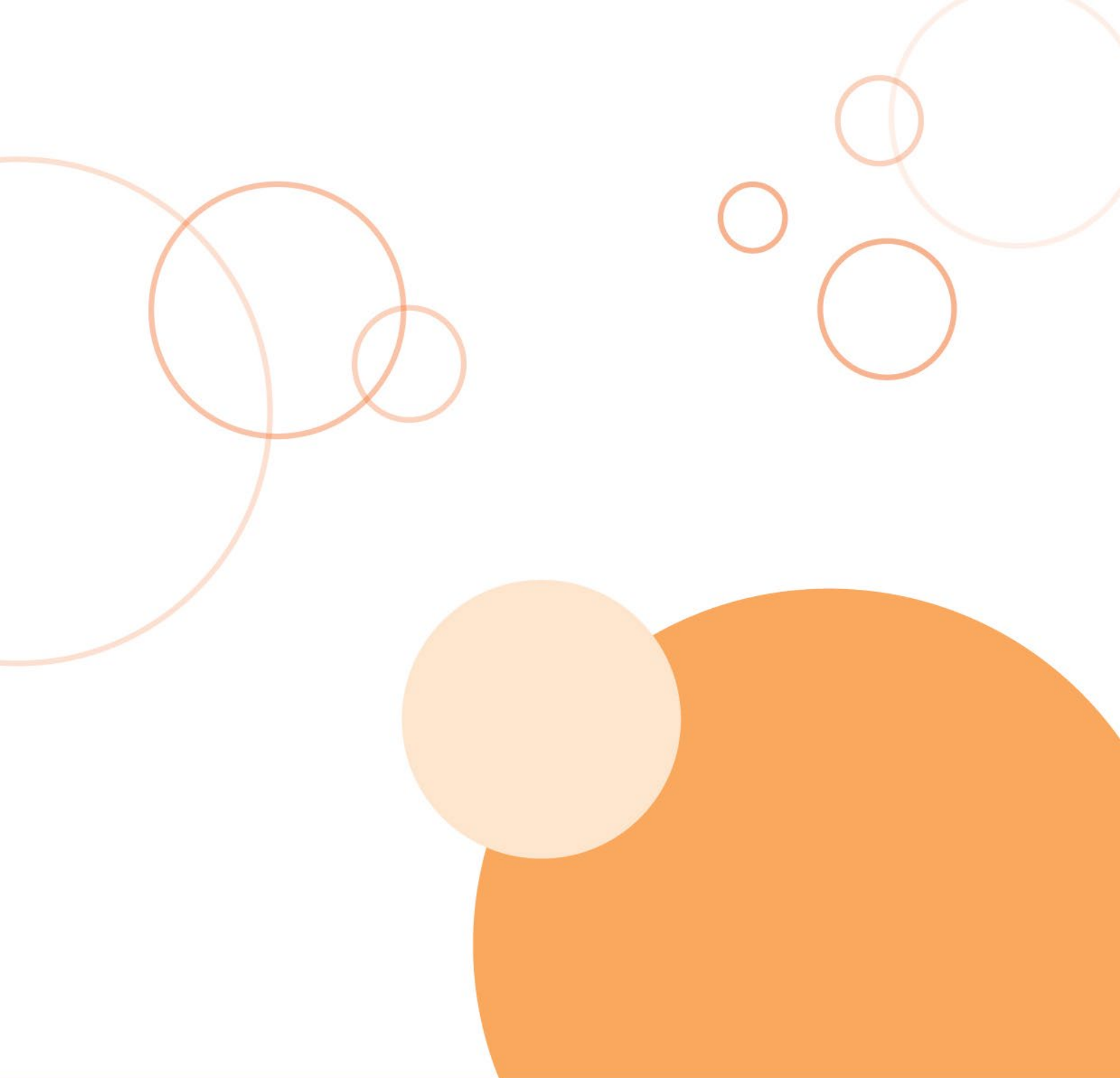
Term 1 Weeks 3–4



Word problem types

Term 1 Week 6

Concept	Problem types	Explanation
Additive	Change problems (join)	One quantity is physically increased when another quantity is added to it
	Change problems (separate)	One quantity is physically decreased when part of the quantity is removed or taken away
	Combine problems	The total of two static quantities is required – there is no physical movement of quantities
	Compare/equalise problems	Two quantities are compared or matched additively – how much more or how much less
Multiplicative	Repeat equal quantities problems	A number of equal-sized groups of items
	Rate problems	A ratio between two measurements
	Ratio comparison problems	Two quantities are compared multiplicatively – how many times as many
	Array problems	Items are arranged in equal-length rows and equal-length columns
	Combination problems	Two or more sets of items are arranged in every possible combination of items

The top half of the page features abstract orange geometric shapes. On the left, there are several overlapping circles of varying sizes, some with thin outlines and others with solid fills. On the right, there is a large solid orange semi-circle at the bottom, with a smaller solid orange circle partially overlapping it. Above these, there are more circles, some with thin outlines and others with solid fills, scattered across the white background.

Appendix B

Assessment task 1

Desert adventure

Task details

Title	Desert adventure
Description	Students imagine that they are an Events Coordinator for a travel company. They plan a camping trip to a desert location of their choice, complying with set parameters, researching relevant information and independently producing a proposal and advertising materials.
Ways of assessing	Written work
Evidence to be collected	A proposal for a 'desert adventure', including full costing and an itinerary together with an advertising pamphlet describing the camping trip to participants.
Suggested time	One to two learning experiences plus additional student research time
Differentiation	Teachers should differentiate their teaching and assessment to meet the specific learning needs of their students, based on their level of readiness to learn and their need to be challenged. Where appropriate, teachers may either scaffold or extend the scope of the assessment task.

Content descriptions

Number and algebra

Calculating with number

- Choose and use flexible and efficient strategies to calculate with whole numbers, involving any of the four operations, and explore the use of the order of operations
- Add and subtract fractions with related denominators using flexible and efficient strategies based on knowledge of equivalence
- Add and subtract decimals to two decimal places, using flexible and efficient strategies
- Multiply decimals by whole numbers and, using flexible and efficient strategies
- Determine a familiar fraction, decimal or percentage of a whole number
- Use estimation and rounding to make reasonable evaluations and justify results

Financial mathematics

- Develop plans for savings goals, predict expenses and identify that saving money with a bank attracts interest

Measurement and geometry

Non-spatial measurement

- Use timetables and itineraries in 12- and 24-hour time systems to determine the duration of events and journeys

Task preparation

Prior learning

Term 1, Weeks 2 and 7; Term 2, Weeks 5 and 8

Resources

- Instructions for students task sheets
- associated resource sheets (Vehicle hire and Camping equipment sale)
- online access

Instructions for teacher

Desert adventure

Read through the Instructions for students task sheet and clarify the requirements with students.

Ensure students understand that the purpose of the activity is for them to show what they have learned about using numbers and measurements to solve real-world problems.

They are expected to independently apply problem-solving and reasoning skills to carry out the task. Students may ask questions and seek assistance if required.

The attached pages include vehicle hire and camping equipment 'advertisements' with pricings and percentage discounts that cater for a range of achievement levels.

Students should identify and seek out other information they need to complete the task.

Clarify what is expected in the itinerary i.e. times listed for each day, including activities, travel and meals and costs – students can use 12- or 24-hour time.

Reassure students that everyone's 'desert adventure' is likely to be different, with different desert destinations and different itineraries, so the costing is expected to be different for each student.

Explain that students will need to make decisions about:

- the supplies they will need to provide for the adventurers (brainstorm as a class to clarify what is described in the Instructions for students)
- where the adventurers will go
- the distance and travel time required
- the meals that will be needed
- what the adventurers will do each day
- the amount of water the adventurers will take with them
- the cost of items that are not in the attached advertisements
- how and/or where students could find the extra information they will need.

When students are individually working, act as a facilitator, providing advice in response to their questions and pointing out considerations they may have overlooked. Make notes about which students require extra help when working through the task. You may find the Marking key helpful while monitoring students' progress.

Instructions to students

Desert adventure

Imagine you work for the Adventure Camping Company as an Events Coordinator whose role is to organise the camping trips that the company advertises and sells to the public.

Your next project is to plan an all-inclusive adventure for a group of four adventurers to travel to and spend five nights camping in a desert location in Western Australia. A camp leader will also accompany the group.

- You will need to write a detailed event proposal for your employer that includes an itinerary and a full list of everything that will be required to be purchased or hired, and the cost of each item. You need to justify any decisions or choices you make in your proposal.

Considerations should include:

- vehicle hire (see attached adverts)
 - purchase of camping equipment (see attached adverts)
 - food
 - water
 - time taken for travel and a daily plan for meals and activities
 - any other equipment or supplies you think will be needed.
- Once you have completed your proposal, design an advertisement for the trip, which should include:
 - the cost per person for the 'desert adventure' (your company needs to make 10% profit, so include that in your calculations)
 - information about the planned activities and timetable
 - what will be included in the cost
 - what the adventurers will need to bring with them.

Notes to assist your planning

- Tents and sleeping bags are already owned by the company, so you don't need to pay for those, but you will need to consider how they will be transported to the desert campsite.
- The company will pay for the following at a set rate. Include these costs in your proposal.
 - Add \$1000 to your total costs to cover the fuel.
 - Add \$350 per day to your total costs to cover a camp leader's salary.
- The adventurers will bring their own clothes and toiletries, but you will supply all food and water needed for the group as well as any other equipment needed for the adventure.
- The following pages contain vehicle and camping equipment advertisements that may help you work out the cost of basic items. Conduct your own research to decide on the cost of food and any other supplies you will need.
- You may choose to include extra equipment that could be used for games, entertainment and other activities while on the trip.

Vehicle hire

Four-wheel drive vehicles for hire

All vehicles seat five people with space for two cubic metres of luggage or equipment.



Image: Yarygin, 2020.

X Hire

Daily rate: \$105

Get 20% off when renting for more than four days

Y Hire

Daily rate: \$95

\$30 off your booking if rented for a full week

Extra charge of \$15 per day for daily travel over 500 kilometres

Z Hire

Daily rate: \$100

Get the fifth day for free when booking more than four days

Trailers for hire

Trailer with space for five cubic metres of luggage or equipment.



Image: babylas, 2014

Q Hire

Daily rate: \$24 with a 5% discount if hired for more than six days

R Hire

Daily rate: \$30 for the first day, then 25% discount for any extra days

Camping equipment sale

		
Gas cylinder	Torch	Camp lantern
\$29.95 each (lasts three days with normal use)	\$18 each (buy two, get one free)	regular price \$100, now reduced by 10%
		
10-cup kettle and coffee pot	Camp combination gas stove (not including gas cylinder)	Cast iron camp oven for baking bread on a camp fire
\$12.50 each	\$150 with 15% off (includes a set of cooking utensils)	\$59.99 with 25% off
		
Folding chair	Plastic water container two sizes available	
on special 30% off regular price of \$85	15 litre \$37 each	20 litre \$55 each
		
Metal plate, cup and bowl set	Folding table	
on special at \$14 a set OR three sets for \$40	\$165 with 20% discount	

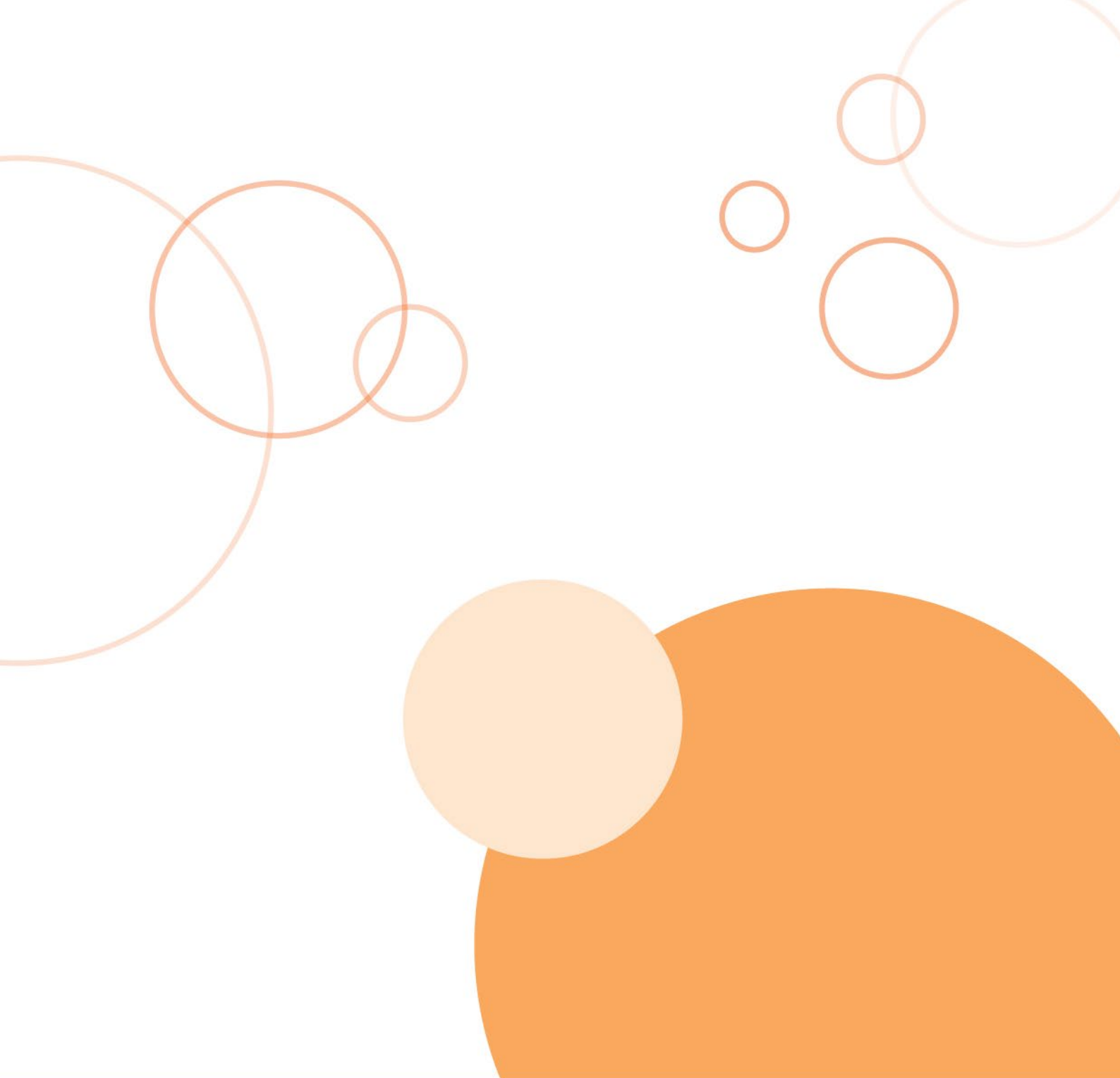
Image acknowledgements: see end of document

Marking key

Description	✓
Overall engagement	✓
Completes task with minimal assistance throughout	
Seeks assistance by asking questions relevant to the task	
Seeks frequent assistance and unsure of information required	
Requires direct input and instruction to support completion of the task	
Number and algebra: Calculating with number	✓
Demonstrates above expected level of knowledge and skills in whole number, decimal and fraction calculations	
Demonstrates expected level of knowledge and skills in whole number, decimal and fraction calculations	
Demonstrates expected level of knowledge and skills only in whole number calculations	
Demonstrates limited knowledge and skills in whole number, decimal and fraction calculations	
Measurement and geometry: Two-dimensional space and structures, Three-dimensional space and structures, and Non-spatial measurement	✓
Converts between and applies all units of measurement relevant to the task	
Converts between some units of measurement relevant to the task Circle which: time, length, volume, mass, capacity, money	
Applies some units of measurement relevant to the task Circle which: time, length, volume, mass, capacity, money	
Requires full or substantial assistance to convert between and apply any units of measurement relevant to the task	
Measurement and geometry: Modelling with measurement and geometry	✓
Uses the entire modelling process	
Asks questions to clarify how to use the modelling process	
Identifies relevant information to mathematically represent the situation but could not communicate the findings in the context of the situation	
Identifies relevant information to mathematically represent the situation but could not solve the problem or communicate findings	

Self-assessment

Description	
Overall engagement	How well I think I did
Read the information carefully	
Planned how to go about the task	
Worked out what to do for myself	
Asked for help only after I tried to work it out myself	
Number and algebra: Calculating with number	
Wrote number sentences and calculated whole numbers	
Wrote number sentences and calculated decimals	
Wrote number sentences and calculated fractions	
Measurement and geometry	
Calculated with length	
Calculated with money	
Calculated with time	
Calculated with mass	
Calculated with capacity	
Calculated with volume	
Converted between units of measurement	



Appendix C

Assessment task 2

Many angles

Task details

Title	Many angles
Description	Students apply what they know about angles to find unknown angles in given figures and to create nets of a prism and a pyramid.
Ways of assessing	Written task
Evidence to be collected	Students' written work
Suggested time	Two 40-minute lessons
Differentiation	Teachers should differentiate their teaching and assessment to meet the specific learning needs of their students, based on their level of readiness to learn and their need to be challenged. Where appropriate, teachers may either scaffold or extend the scope of the assessment task.

Content descriptions

Measurement and geometry

Two-dimensional space and structures

- Investigate angles in a right angle, on a straight line, angles at a point and vertically opposite angles, to determine unknown angles and explain reasoning

Three-dimensional space and structures

- Visualise, sketch and construct three-dimensional objects, including prisms and pyramids

Task preparation

Prior learning

Term 2 Daily practice and Week 5; Term 4, Daily practice and Week 6

Assessment task

Assessment conditions

This task consists of individual work to be completed as two parts in class.

Resources

- Part 1: Task sheet
- Part 2: Blank piece of A3 paper, protractor, compass and ruler

Instructions for teacher

Many angles

Part 1

Provide students with a copy of the *Many angles – task sheet*. Protractors are not permitted in Part 1.

Explain to students that they must follow the instructions and calculate the sizes of the unknown angles.

Inform students that the sizes of some angles are given on the task sheet and that those angles will provide enough information for them to work out any missing angle sizes. During class activities prior to this assessment, students had the opportunity to learn that:

- the number of degrees in a full turn of a circle is 360°
- the sum of the angles around a point is equal to 360°
- the sum of the interior angles of a quadrilateral is 360°
- a straight angle is 180°
- the sum of the interior angles of a triangle is 180° .

If necessary, assist individual students by answering questions related to the above, making sure to annotate the assistance provided.

Encourage students to explain their thinking in the spaces provided, to gain an insight into their reasoning.

Part 2

Provide each student with a blank piece of A3 paper, protractor, compass, ruler, sharp pencil and an eraser.

Ask students to draw a net to construct a prism and a net to construct a pyramid. They should use only a ruler and a protractor to draw the nets as accurately as they can.

Inform students they can choose the type of shape (polygon) they use for the base of the pyramid and for the end faces of their prisms.

For each net, they must explain how they used angles and measurements to create their polygons and nets. They must include the size of key angles they used to construct their nets and explain why they are important. Encourage students to write notes and use arrows to show which part of their net they are explaining.

Explain that you will assess how they have used angles and measurements to ensure their nets will fold correctly to make a prism and a pyramid.

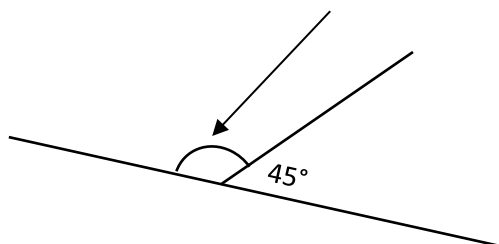
When students are satisfied with their nets, if sufficient time has been allowed, have them trace their nets onto another A3 piece of paper prior to handing in their work. They can then physically construct their prisms and pyramids, which could supplement the assessment if desired.

Many angles – Task sheet

Name _____ Year _____ Class _____ Date _____

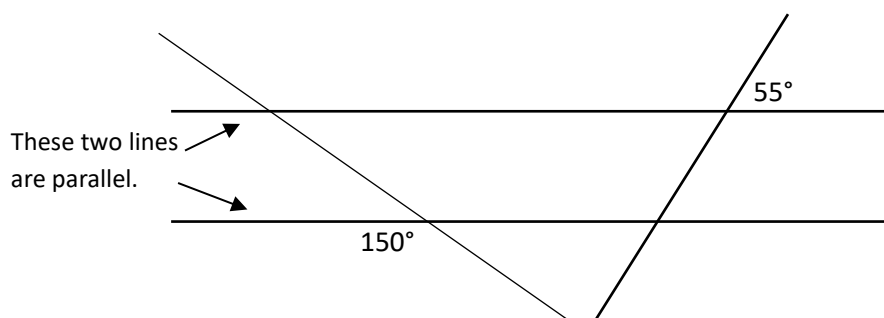
Part 1

a. What is the size of this angle? _____



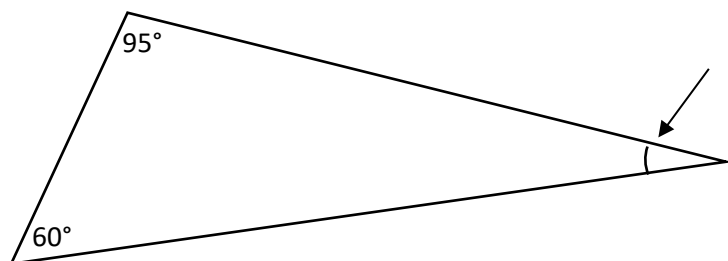
How do you know?

b. Try to write the sizes of all the missing angles in this diagram.



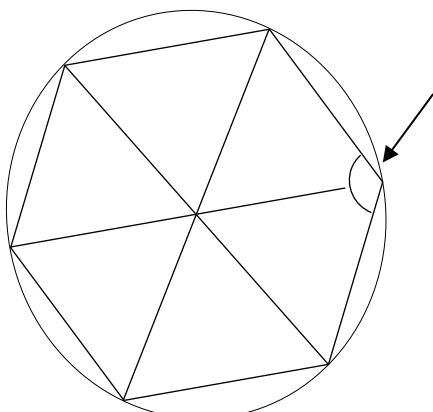
Explain your thinking.

c. What is the size of this angle? _____



How did you work it out?

d. What is the size of this angle? _____



Explain how you could prove this.

Marking key

Part 1

Description	✓
Part 1a	✓
Provides correct angle size	
Mentions 'straight angle' or 'straight line' is 180°	
Part 1b	✓
Provides all angle sizes, which are correct	☐
Provides correct angle sizes around both points	☐
Provides correct angle sizes around only one of the points	☐
Provides two correct angle sizes	☐
Provides one correct angle size	☐
Explains method for calculating unknown angle sizes, referring to 180° or 360° appropriately. For example, refers to 'vertically opposite angles' as equal and mentions practical ways to check, e.g. folding or placing the angles on top of one another.	
Part 1c	✓
Provides correct angle size	
Refers to the sum of the interior angles equalling 180°	
Part 1d	✓
Provides correct angle size	
Reasons that three corners of triangle sum to 180° and therefore deduces that each is 60° , doubling to 120° or Reasons that a circle is 360° , which when divided into six equal parts results in each angle around the centre point measuring 60° and therefore deduces that the angles touching the circle's circumference are also 60° (which double in each triangle to 120°) or Provides other correct reasoning to justify angle size	

Marking key

Part 2

Description	✓
Part 2A – Prism	✓
Provides a logical net for a prism	
Makes use of angles and justifies reasons, e.g. a right angle equals 90°	
Makes use of measurements and justifies reasons, e.g. measures to make sure matching edges are the same length and the edges are parallel	
Optional: Constructs a successful prism from their net	
Part 2B – Pyramid	✓
Provides a logical net for a pyramid	
Makes use of angles and justifies reasons, e.g. the apex angles of the pyramid must sum to less than 360°	
Makes use of measurements and justifies reasons, e.g. measures to make sure matching edges are the same length	
Optional: Constructs a successful pyramid from their net	

Acknowledgements

Appendix A

Diagnostic tasks

Thermometer from: Department of Education WA. (2002). *Knowing What They Know – Understanding Students’ Mathematical Ideas in Years 6 to 9* (2nd ed.) (Revised 2013), p. 73.
© Department of Education 2002

Appendix B

Vehicle hire

Adapted from: Varygin, D. (2020). [Photograph of white van in desert]. Retrieved January, 2026, from <https://pixabay.com/photos/van-vanlife-auto-travel-truck-4863478/>

Adapted from: babylas. (2014). [Photograph of a silver trailer]. Retrieved January, 2026, from <https://pixabay.com/photos/trailer-hauling-moving-vehicle-402017/>

Camping equipment sale

Gas cylinder adapted from: flyerwerk. (2016). [Photograph of two different sized gas cylinders]. Retrieved January, 2026, from <https://pixabay.com/photos/gas-bottle-gas-bottle-refilling-1750491/>

Torch from: Bayik, H. (2012). *Torch*. Retrieved January, 2026, from <https://openclipart.org/detail/171446/torch>

Camp lantern from: Edurs34. (2020). [Graphic of kerosene lamp]. Retrieved January, 2026, from <https://pixabay.com/illustrations/kerosene-lamp-oil-lamp-old-lamp-5558652/>

Camp combination gas stove adapted from: Tein, H. N. (2016). [Photograph of meat cooking on a barbecue]. Retrieved January, 2026, from <https://pixabay.com/photos/smoke-bbq-barbecue-grill-grilled-1568953/>

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