Year 6 unit overview — Australian Curriculum: Mathematics

Source: Australian Curriculum, Assessment and Reporting Authority (ACARA), *Australian Curriculum v3.0: Mathematics for Foundation–10*,<www.australiancurriculum.edu.au/Mathematics/Curriculum/F-10>.

| School name | Unit title | Duration of unit |
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| X Primary School | Area and Perimeter  | 3 Weeks  |

| Unit outline |
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| Students build on previously learned knowledge in early years about area and perimeter. Ideally this unit will follow on from students learning about ‘Connecting decimal representations to the metric system’ [(ACMMG135)](http://ausvels.vcaa.vic.edu.au/Curriculum/ContentDescription/ACMMG135) and learning to ‘Convert between common metric units of length, mass and capacity’ [(ACMMG136)](http://ausvels.vcaa.vic.edu.au/Curriculum/ContentDescription/ACMMG136). If this is done then students can use that knowledge when looking at area and perimeter.The student’s knowledge of the content will be built upon by looking at area and perimeter in a real life context. To do this many of the learning experiences will be practical with students given the chance to manipulate materials and solve real life problems. The big idea of this unit is how we use area and perimeter in real life situations.Inquiry questions in this unit:* When is area and perimeter used in real life?
* How is area and perimeter calculated?
* What is the relationship between area and perimeter?
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| Identify curriculum |
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| Content descriptions to be taught | General capabilities and cross‑curriculum priorities |
| Number and Algebra | Measurement and Geometry |
| **Number and place value**Select and apply efficient mental and written strategies and appropriate digital technologies to solve problems involving all four operations with whole numbers [(ACMNA123)](http://ausvels.vcaa.vic.edu.au/Curriculum/ContentDescription/ACMNA123) | **Using units of measurement**Solve problems involving the comparison of lengths and areas using appropriate units [(ACMMG137)](http://ausvels.vcaa.vic.edu.au/Curriculum/ContentDescription/ACMMG137) | gc_literacy Literacy* Use appropriate mathematical language specific to the topic

gc_numeracy Numeracy* Make links to real-life applications

gc_ict **ICT capability*** Use technologies to assist in developing an understanding of area and perimeter

gc_critical Critical and creative thinking* Use thinking skills to complete group activities and open-ended tasks, creating and answering questions

gc_personal_social **Personal and social capability*** Work together to participate in maths investigations and learning experiences
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| **Proficiencies** |
| **Opportunities to develop proficiencies include:****Understanding** * Making reasonable estimations

**Fluency**  * Measuring using metric units
 | **Problem Solving** * Formulating and solving authentic problems using fractions, decimals, percentages and measurements

**Reasoning** * Explaining mental strategies for performing calculations
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| **Achievement standard** |
| By the end of Level 6, students recognise the properties of prime, composite, square and triangular numbers. They describe the use of integers in everyday contexts. They solve problems involving all four operations with whole numbers. Students connect fractions, decimals and percentages as different representations of the same number. They solve problems involving the addition and subtraction of related fractions. Students make connections between the powers of 10 and the multiplication and division of decimals. They describe rules used in sequences involving whole numbers, fractions and decimals. Students connect decimal representations to the metric system and choose appropriate units of measurement to perform a calculation. They make connections between capacity and volume. They solve problems involving length and area. They interpret timetables. Students describe combinations of transformations. They solve problems using the properties of angles. Students compare observed and expected frequencies. They interpret and compare a variety of data displays including those displays for two categorical variables. They evaluate secondary data displayed in the media.Students locate fractions and integers on a number line. They calculate a simple fraction of a quantity. They add, subtract and multiply decimals and divide decimals where the result is rational. Students calculate common percentage discounts on sale items. They write correct number sentences using brackets and order of operations. Students locate an ordered pair in any one of the four quadrants on the Cartesian plane. They construct simple prisms and pyramids. Students list and communicate probabilities using simple fractions, decimals and percentages. |

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| Relevant prior curriculum | Curriculum working towards |
| **In the Australian Curriculum: Mathematics at Year 5****Measurement and Geometry**Using units of measurement* Choose appropriate units of measurement for length, area, volume, capacity and mass[(ACMMG108)](http://ausvels.vcaa.vic.edu.au/Curriculum/ContentDescription/ACMMG108)
* Calculate the perimeter and area of rectangles using familiar metric units [(ACMMG109)](http://ausvels.vcaa.vic.edu.au/Curriculum/ContentDescription/ACMMG109)
 | **In the Australian Curriculum: Mathematics at Year 7****Measurement and Geometry**Using units of measurement* Establish the formulas for areas of rectangles, triangles and parallelograms and use these in problem solving [(ACMMG159)](http://ausvels.vcaa.vic.edu.au/Curriculum/ContentDescription/ACMMG159)
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| Links to other learning areas |
| **In the Australian Curriculum: English at Year 6****Reading and Viewing**Language* Identify and explain how analytical images like figures, tables, diagrams, maps and graphs contribute to our understanding of verbal information in factual and persuasive texts [(ACELA1524)](http://ausvels.vcaa.vic.edu.au/Curriculum/ContentDescription/ACELA1524)

**Speaking and Listening**Literacy* Participate in and contribute to discussions, clarifying and interrogating ideas, developing and supporting arguments, sharing and evaluating information, experiences and opinions [(ACELY1709)](http://ausvels.vcaa.vic.edu.au/Curriculum/ContentDescription/ACELY1709)
* Use interaction skills, varying conventions of spoken interactions such as voice volume, tone, pitch and pace, according to group size, formality of interaction and needs and expertise of the audience[(ACELY1816)](http://ausvels.vcaa.vic.edu.au/Curriculum/ContentDescription/ACELY1816)
* Plan, rehearse and deliver presentations, selecting and sequencing appropriate content and multimodal elements for defined audiences and purposes, making appropriate choices for modality and emphasis [(ACELY1710)](http://ausvels.vcaa.vic.edu.au/Curriculum/ContentDescription/ACELY1710)

**In the Australian Curriculum: The Arts*** The students are given options to create in their assessment task ‘Build your Dream House’ and in the final lesson in the unit.
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| Teaching and learning |
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| Teaching strategies and learning experiences |
| This unit has been constructed using the e5 instructional model. The E5 model follows a sequence of:* Engage — begin with a lesson that captures children’s interest through an activity or question.
* Explore — organise hands-on activities where children explore a concept or skill.
* Explain — guide children to develop explanations for the experience after they have explored a concept or skill.
* Elaborate — encourage children to apply what they have learnt to a new situation.
* Evaluate — provide an opportunity for children to review and reflect on their learning.
 |
| **Lesson** | **Focus** | **Activities** | **Resources** | **Assessment** |
| 1 | * Introduction to the unit
* Maths Literacy: area, perimeter, length, width
* Area and Perimeter
* Assess prior learning
* Developing awareness that shapes with the same perimeter can have a different area
 | * Engage
* Read Spaghetti and Meatballs for All by Marilyn Burns
* Explore
* Students are tasked with finding a solution to the problem presented in the book. Using coloured tiles they need to figure out the different rectangular table arrangements that would fit all 32 people. Before the students do this task the teacher model this task by doing an example with them using a smaller amount.
* Explain
* The teacher stops the students after a while then guides them through a discussion about the concepts of perimeter and area and how they apply to the situation.
* Elaborate
* They need to draw their solutions on graph paper stating how many tables are needed and how many people will fit. They record the area and perimeter of the tables.
* Evaluate
* Students discuss as a group what they discovered from the activity.
* The teacher digitally records the student’s reflections.
 | * Teacher:
* Spaghetti and Meatballs for All by Marilyn Burns
* Laptop
* Whiteboard
* Students
* Coloured tiles
* Graph paper
 | * Formative Assessment
* Observation of the students learning
* Students participation in discussion: whole class and when working
* Students answers to the task
 |
| 2 | * Area and Perimeter
* Assess prior learning
* Developing awareness that shapes with the same perimeter can have a different area
 | * Engage
* Fluency activity. Students play a short game in pairs aimed at practising multiplication facts which will be relevant when learning area.
* Whole class reflection on the task completed last session.
* Explore
* Continuing from the lesson before students discuss options to figure out the least and most expensive table arrangements.
* Explain
* Teacher leads the class in a brainstorming session helping students to work through the problem.
* Elaborate
* While the students explore options the teacher roves around and assists students and asks leading questions to further their learning.
* *Students should be able to work with just graph paper but students may use tiles if they need more concrete tools.*
* Evaluate
* Students reflect by writing, answering these questions: what patterns did you notice? Were they useful? What table arrangements are the most and least expensive? What did you notice about the areas and perimeters of the arrangements you made?
 | * Teacher:
* Spaghetti and Meatballs for All by Marilyn Burns
* Whiteboard
* Students
* Last sessions task
* Tiles
* Graph paper
 | * Formative Assessment
* Observation of the students learning
* Students participation in discussion: whole class and when working
* Students answers to the task
 |
| 3 | * Calculating Perimeter
* Real world applications for perimeter
* Group work
 | * Engage
* Students play a quick game competing against one another. 2 students at a time, first to answer an addition question wins.
* Explore
* What are the real world applications for Perimeter? Brainstorm as a class for a bit.
* Pose the following scenario to the students: A farmer wants to make the largest holding pen for their sheep. S/He has 16m of fencing materials. How could s/he make the largest pen?
* Explain
* Teacher led class discussion.
* Teacher explains what is expected of the students in the lesson and what the questions the students need to answer.
* Elaborate
* While students work on the activity, the teacher will roam around questioning and helping the students.
* Evaluate
* Students present their findings to the class. This might be done by making a poster if there is time.
 | * Teacher:
* Whiteboard
* Students
* Graph paper
* Toothpicks
* Straws
* Ruler
* Coloured tiles
* Poster paper
* Any other materials the students may want to use
 | * Formative
* Observation of the methods students use to find different solutions
* The solutions that the students come up with
* Students presenting their findings (oral presentation)
 |
| 4 | * Calculating perimeter
 | * Engage
* Play the first half of the song Math Rocks! Perimeter and Area
* Explore
* Whole class discussion on what the students already know about calculating perimeter.
* Explain
* Teacher does examples on the board of how to calculate perimeter in different shapes.
* Elaborate
* Students work through worksheets tailored to their ability level.
	+ Beginning: Worksheets will have: shapes over graph paper, all lines of the shape will be labelled.
	+ Medium: Worksheets will have: composite and irregular shapes, only some of the lengths labelled, some shapes will be labelled with decimals rather than whole numbers, they will have to use dot paper to draw their own shapes after having been given a perimeter
	+ High: Students will be given worded problems without images e.g. what is the length of each side of a shape (square, rectangle, equilateral triangle, and hexagon) with the following perimeter.
* Evaluate
* Class discussion. Students reflect on what they learnt.
 | * Teacher:
* Math Rocks! Perimeter and Area

<https://www.youtube.com/watch?v=D5jTP-q9TgI> (0.00-1.27)* Student:
	+ Worksheet
 | * Formative
* Observation of the student
* Worksheets/maths book
 |
| 5 | * Circumference of a circle
* Maths literacy: terms: circumference, diameter, radius, pi
 | * Engage
* Pose the question: how would we measure the perimeter of a circle?
* Explore
* Discuss why we would need to know the perimeter of a circle.
* Explain
* Introduce and explain the new vocabulary: circumference, diameter, and radius.
* Elaborate
* Give each student a piece of string and a ruler, they need to measure the piece of string and record the length. Measure the outside of the circle. Ask the students to measure the distance across the circle, see if they can figure out how the diameter relates to the circumference. Students should come up with Pi.
* *Advance students can work through this activity with little supervision. The teacher can work at a table or on the floor with students at a lower ability level.*
* Evaluate
* Discuss and reflect as a group on the floor.
 | * Teacher:
* whiteboard
* Students
* Paper plate
* String
* ruler
 | * Formative
* Observation of the methods students use to find different solutions
* The solutions that the students come up with
 |
| Homework | * Perimeter Homework Sheet
 | * Perimeter Homework Sheet
 | * Summative: this will provide feedback to the teacher about what the students know about perimeter
 |
| 6 | * Lengths, Perimeters and Areas of Shapes
 | * Engage
* Students play Pyramid Panic lite.
* Explore
* Teacher interrupts students and tells them to pauses the game. Asks them what sort of maths is involved in playing the game. What have you found difficult?
* Explain
* Students explain some of the mathematical concepts that they have had to use to get through the game.
* Elaborate
* Students continue playing the game. As they play the teacher will rove around observing and offering assistance to students.
* Evaluate
* Students write a reflection about what they have learnt by playing the game.
 | * Teacher:
* Overhead projector
* Laptop
* Students
* Laptops
* Website: [www.mangahigh.com](http://www.mangahigh.com) (the game Pyramid panic lite)
 | * Formative:
* Observation of the students
* Discussions with students
* Summative:
* Manga high gives the teacher feedback of the students ability levels
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| 7 | * Area of irregular and compound shapes
 | * Engage
* Students play a game to improve their fluency in multiplication. Roll x2 12 sided dice. Figure out the answer.
* Explore
* Brainstorm real world applications for area. How would we go about finding the area of an irregular or compound shape? Get students to think about it.
* Explain
* Explain what irregular and compound shapes are. Do examples on the board with the students.
* Elaborate
* Separate the students into two groups. These groups will change half way through the lesson so the students get the chance to do both activities.
* Activity One: Students play a maths game online. There are different levels to choose from so the teacher can assign a level appropriate to the individual student.
* Activity Two: The lower level students work on problems with the teacher on whiteboards.

Or* Activity Three: The higher level students work on differentiated maths worksheets.
* Evaluate
* Students reflect in their maths book what they have learnt in this lesson.
 | * Teacher:
* Whiteboard
* Students
* Task One: laptops, website: <http://www.bgfl.org/bgfl/custom/resources_ftp/client_ftp/ks2/maths/perimeter_and_area/index.html>
* Task Two: whiteboards, marker
* Task Three: worksheet
 | * Formative:
* Observation of the students
* Discussions with students
* Students work on the worksheets
 |
| 8 | * Area of Triangles
* Formula for area of triangles
* Maths literacy:
* Base, height
 | * Engage
* Students play a game to improve their fluency in multiplication.
* Explore
* Pose the question when would we need to know the area of a triangle?
* Explain
* Explain the formula for figuring out the area of a triangle.
* Elaborate
* Students work through worksheets that have been targeted to their ability level. The teacher will walk around observing and assisting students.
* Evaluate
* A mix and match game at the end of the lesson. Teacher has 3 triangles up on the board and their areas and students will match them together.
* Students will then reflect in a teacher led whole class discussion about what they have learnt.
 | * Teacher:
* whiteboard
* Students
* worksheets
 | * Formative:
* Observation of the students
* Discussions with students
* Students work on the worksheets
 |
| 9 | * Dream House Project
* Area and Perimeter in a real life context
 | * Engage
* Introduce the project that the students are going to be doing: designing their dream house! They will have to stick to a budget though and the house can only be one story high.
* Explore
* Discuss with students everything that they have learnt so far.
* Decide with them what their final project should reflect from their learning.
* Create a rubric together of what skills they should show when creating a dream house.
* Explain
* Explain that the house will be worked on in a group. Go into detail about what is expected to be in the house.
* Elaborate
* The teacher will decide on the groups of students (3 in a group).
* Students look over floor plans. They will then discuss what they want in their house.
* Evaluate
* Students discuss what ideas they have come up with in a whole class discussion.
 | * Teacher:
* Whiteboard
* Projector
* laptop
* Students
* House floor plans <http://www.iwantthatdesign.com.au/designs?&v=t&it=1>
 | * Formative:
* Students participation in discussion
 |
| Homework | * Homework Sheet on Area
* Measure household items for area and perimeter. Information to be used in the dream house project.
 | * Homework sheet on Area
 | * Summative: this will provide feedback to the teacher about what the students know about area
 |
| 10 | * Dream House Project
 | * Students are instructed that their dream house must have: a living room, kitchen, two bedrooms, 2 bathrooms, a garage and another room of their choice. Each room must be labelled and coloured coded. They also need to have a fenced in backyard and a garden within the backyard shaped like a square.

They also have to calculate the area and the perimeter of the whole house, each room, and the objects in the room, the backyard and the garden. | * Grid Paper
* Pencils
* Calculator (To check work)
* Floor Plans)
 | * Summative: Will be marked with a rubric that will be given back to the students. The teacher will also discuss with the students one-on-one how they did.
 |
| 11 |
| 12 |
| 13 |
| 14 | * Present their dream house to the class
 | * The students present their finished project to their class.
* The teacher will ask the students questions to clarify that they have understood everything that they have done.
* The audience (other groups) will give feedback: things they liked, things they learned, ideas for improvement.
 | * Students finished product
 |
| 15 | * Reflection of Learning
 | * Students are to create a product to teach another class (say grade 2) about perimeter and area. They must define both concepts, how to find the value of area and perimeter, how they are measure, why each is important in real life, demonstrate an understanding of perimeter and area. Their product can be a song, an illustrated poster, a story book.
 | * Student:
* Poster paper
* Coloured paper
* Computer/laptop
* Their maths book
 | * Summative: the teacher will mark the student’s progress and understanding on the topic against a rubric of what s/he wanted them to understand at the end of the unit.
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| Homework | * Above activity to be completed for Homework
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| Supportive learning environment |
| Adjustments for needs of learners |
| * Classroom activities are suitable for differentiated learners as worksheets and activities are aimed at the different ability levels of students.
* Students will be split into groups to do work targeted to their level.
* In the last activity students have the option to choose how they present their work. This will give them the chance to do activities that use the multiple intelligences.
* When working on a group task students will be split up so the groups are made up of different ability levels so that the students with a higher understanding will be able to assist those with a lower understanding.
* If any student has a hearing or visual problems the teacher will make sure that they are seated near the front of the class.
* All activities will be accompanied by visuals when possible to accommodate for students with hearing problems or students who have a low level of English understanding.
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**La Trobe University**

**Bachelor of Teaching (Primary)**

# LESSON PLAN FORMAT

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| **Name:** Emma Arthur |
| **School:** X Primary School**Topic:** Area and Perimeter**Learning Area:** Mathematics | **Date: -****Year Level:** Grade 6**Duration:** 1 hour |

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| **Learning Purpose:** To see what students already know about area and perimeter and to introduce them into the topic. Students will be reminded/learn of the terms: area, perimeter, length and width. They will learn how to calculate both and develop an awareness that shapes with the same perimeter can have a different area.**VELS references:** **Measurement and Geometry****Using units of measurement**Solve problems involving the comparison of lengths and areas using appropriate units [(ACMMG137)](http://ausvels.vcaa.vic.edu.au/Curriculum/ContentDescription/ACMMG137) |

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| **Activity** | **Group set up** | **Materials** |
| **Engagement:** * Read Spaghetti and Meatballs for All by Marilyn Burns

**Procedure:** * Explore
* The teacher checks for comprehension of the text. Ask multiple students “What was Mrs. Comfort worried about?”
* Students should answer that Mrs. Comfort was worried that there was not enough room for all of her quests to have a seat at the table. The teacher will then ask leading questions to get more information from the students “Why wasn’t there enough room at the table?” and “In the book what solution did the Comfort’s come up with?”
* Students may want to demonstrate their point by drawing on the board or finding a page in the book, this is encouraged.
* Draw the students to the realisation that if two tables are pushed together, then you lose a spot at the table, where the two tables are touching.
* Set the students a task. “Use coloured tiles to explore the different ways to arrange four tables”. Be explicit in giving instructions “the tiles must touch along an entire side; they are not allowed to touch only part of the side or the corners”. Draw an example on the board.
* Students are sent to their tables. Tiles have been put there before the lesson started.
* Explain
* The teacher will rove around the room keeping students on task. Once everyone –or most of the class- has had a chance to work on the problem the teacher will stop the students.
* The teacher will ask the students “What arrangements did you make?” “What did you find out?” The teacher will draw the arrangements on the board so all the students can see. The teacher will write next to the arrangements their measurements eg. 1x4, 2x2.
* The teacher will ask the students how many people can sit at each table.
* Then the teacher will explain that the amount of people that can sit at each table is the perimeter because each person takes up one unit of length. The teacher will look at some other examples with the students.
* The teacher will then explain area to the students.
* Elaborate
* Students are then tasked with finding a solution to the problem presented in the book. Using coloured tiles they need to figure out the different rectangular table arrangements that would fit all 32 people.
* They need to draw their solutions on graph paper stating how many tables are needed and how many people will fit. They record the area and perimeter of the tables.
1. **Pulling it together:**

Evaluate* Students discuss as a group what they discovered from the activity.
* The teacher digitally records the student’s reflections.
 | Whole ClassWhole ClassIndividual Task (allowed to discuss with others on their table)Whole ClassIndividual Task (allowed to discuss with others on their table)Whole Class | Spaghetti and Meatballs for All by Marilyn Burns WhiteboardWhiteboard markerColoured TilesGraph PaperPencil/Pen |

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| **Observations of students’ learning:*** Formative Assessment: the discussions and observations that students have. The solutions that the students come up with. Participation in the whole class discussion at the start of the lesson and in the reflection at the end.
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| **Teacher’s Resources:** * Spaghetti and Meatballs for All by Marilyn Burns
* Whiteboard
* Whiteboard marker
* Coloured Tiles
* Graph Paper
* Pencil/Pen
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| **Catering for inclusion:** * The teacher will encourage students who are shy or at a lower level and might be unsure,
* Extra teacher support will be given to students who need help
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| **Your reflection** |

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| **Supervisor’s comments:**  |