Year 3 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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| Our School | Exploring shapes and angles | 10 hours |

| Unit outline |
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| Students identify and use their knowledge and understandings of angles, symmetry and three-dimensional shapes to design a robot that meets a design brief.The big idea of this unit is exploring the way angles and symmetry in shapes can be used to create or enhance designs. Inquiry questions for the unit:* What is an angle?
* What is symmetry?
* Where do angles and symmetry exist in natural and built environments?
* How can you use angles and symmetry to create or enhance a design?
* What are key features of three-dimensional shapes?
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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 | Statistics and Probability |
|  | Using units of measurement* Tell time to the minute and investigate the relationship between units of time [(ACMMG062)](http://www.australiancurriculum.edu.au/Curriculum/ContentDescription/ACMMG062)

Shape* Make models of three-dimensional objects and describe key features [(ACMMG063)](http://www.australiancurriculum.edu.au/Curriculum/ContentDescription/ACMMG063)

Location and transformation * Identify symmetry in the environment [(ACMMG066)](http://www.australiancurriculum.edu.au/Curriculum/ContentDescription/ACMMG066)

Geometric reasoning * Identify angles as measures of turn and compare angle sizes in everyday situations [(ACMMG064)](http://www.australiancurriculum.edu.au/Curriculum/ContentDescription/ACMMG064)
 |  | gc_literacy Literacy* Recognise different types of content words belonging to Mathematics
* Recognise adjectives that carry a high load of conceptual and abstract meaning
* Interpret graphic information in designs
* Classify different shapes according to their features
* Compose visual texts (labelled design)

gc_numeracy Numeracy* See mathematics as important to everyday living
* Recognise angles and symmetry in the environment and apply knowledge within a range of real-life contexts
* Apply geometric understanding to design

gc_ict **ICT capability*** Experiment and use ICTs to create a response to the design brief
* Represent ideas, information and thinking
* Develop imaginative responses
* Record evidence of learning
* Recognise some elements of images in communication
* Apply basic formatting strategies

gc_critical Critical and creative thinking* Interpret the design brief
* Create responses or solutions to the design brief
* Identify angles and symmetry
* Justify choices within design
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| Achievement standard |
| By the end of Year 3, students recognise the connection between addition and subtraction and solve problems using efficient strategies for multiplication. They model and represent unit fractions. They represent money values in various ways. Students identify symmetry in the environment. They match positions on maps with given information. Students recognise angles in real situations. They interpret and compare data displays.Students count to and from 10 000. They classify numbers as either odd or even. They recall addition and multiplication facts for single digit numbers. Students correctly count out change from financial transactions. They continue number patterns involving addition and subtraction. Students use metric units for length, mass and capacity. They tell time to the nearest minute. Students make models of three-dimensional objects. Students conduct chance experiments and list possible outcomes. They carry out simple data investigations for categorical variables. |
| Proficiencies |
| Opportunities to develop proficiencies include:Understanding * identifying environmental symmetry

Fluency * communicating positions
 | Problem Solving * making models of three-dimensional objects

Reasoning * comparing angles
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| Relevant prior curriculum | Curriculum working towards |
| **In the Australian Curriculum: Mathematics at Year 2**Measurement and GeometryShape* Describe and draw two-dimensional shapes, with and without digital technologies.
* Describe the features of three-dimensional objects.

Location and transformation* Identify and describe half and quarter turns.
 | **In the Australian Curriculum: Mathematics at Year 4** Measurement and GeometryShape* Compare and describe two-dimensional shapes that result from combining and splitting common shapes, with and without the use of digital technologies.

Location and transformation* Create symmetrical patterns, pictures and shapes with and without digital technologies.

Geometric reasoning* Compare angles and classify them as equal to, greater than or less than a right angle.
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| Bridging content |
| The concept of angles is not covered in the Essential Learnings by the end of Year 3. However, half, full, quarter and three-quarter turns have been addressed in relation to direction. |
| Links to other learning areas |
| Technology — design processVisual Art — line, shape, composition, texture |

| Assessment | Make judgments |
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| Describe the assessment | Assessment date | Teachers gather evidence to make judgements about the following characteristics of student work:Understanding* selection and application of mathematical knowledge and information to solve problems
* description of choices made, strategies used and conclusions reached, and checks of the reasonableness of solutions
* modelling and representation

Skills* application of problem-solving strategies to investigate situations
* description of the results of mathematical investigations
* use of mathematical procedures and calculations to find solutions
* communication of explanations, solutions and calculations, using mathematical language, conventions and symbols

For further advice and guidelines on constructing guides to making judgments refer to the Learning area standard descriptors: [www.qsa.qld.edu.au](http://www.qsa.qld.edu.au) |
| Students are given opportunities to demonstrate their knowledge, skills and understanding through both formative and summative assessment. The assessment is collated in student folios and allows for ongoing feedback to students on their learning.Year 3 teachers make decisions about the length of time required to complete the tasks and the conditions under which the assessment is to be conducted.The teaching and learning experiences throughout the term provide opportunities for students to develop the understanding and skills required to complete these assessments. As students engage with these learning experiences the teacher can provide feedback on specific skills. | Weeks 8–9 |
| Mathematical investigation: Journal (Written) Investigate shapes and angles.Students create angles and recognise equivalence in angles. They identify the occurrence of symmetry in the environment and use symmetry to create symmetrical pictures and shapes.Student journals may include samples of work that:* identify and recognise the occurrence of angles and symmetry in the natural and built environment
* identify, recognise and label right, straight and equivalent angles and symmetry in given design
* represent design ideas or plans for a robot within an environment that meets a design brief based on angles and symmetry.

The assessment package *Exploring 3D objects, angles and symmetry* in the QSA Assessment Bank could be used in this unit. |

| Teaching and learning | Supportive learning environment |
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| Teaching strategies and learning experiences | Adjustments for needs of learners | Resources |
| * Provide opportunities for students to apply knowledge of features of 2-D shapes to draw models of 2-D shapes as revision and consolidation of prior learning.
* Revise properties of 3-D shapes and identify objects within the school environment that are common 3-D shapes.
* Make models of 3-D shapes from nets provided by the teacher and discuss features of the shapes.
* Identify purpose of unit through explanation of assessment and necessary mathematical understandings and processes.
* Set up mathematical learning log to record all evidence of learning throughout unit.
* Create a word bank of vocabulary used to discuss and describe 2-D and 3-D shapes and their properties including edges, corners, surfaces, angles (right, straight and equivalent), nets and symmetry (classroom word wall & student learning log).
* Explore how lines intersect to form a definition of angles.
* Recall and recognise angles in natural and built environments to build a bank of descriptors for angles, including quarter turn, clockwise and anti-clockwise direction of turn and equivalence of angles.
* Tell time to the minute, and discuss angles of the hands on analogue clocks.
* Understand the relationship between half turns and 30 minutes on the analogue clock, and quarter turns and 15 minutes.
* Create angle tester and test on 2-D and 3-D shapes and then in the environment (see resources).
* Take photos of angles in the environment and create a pictorial bank (learning log).
* Use the various angle testers to identify angles in the natural and built environment and communicate their choice to an adult (consultation).
* Explore symmetry within 2-D shapes by, for example, cutting a range of 2-D shapes in half to see if they match, and create definitions in the learning log.
* Recall and identify symmetry in the natural and built environment.
* Recognise symmetry in the environment.
* Take photos of symmetry in the environment and create a pictorial bank (learning log).
* Expose students to a range of designs to identify textual features, including using ICTs.
* Model a design of a house using 2-D shapes in alignment with design brief.
* Model how to identify angles and symmetry within house design with justifications.
* Co-construct a design of an object, e.g. car, boat, bike, ripstick (peer evaluation).
* Use guided questioning to identify choice of strategies for angle and symmetry recognition within design.
* Choose modelled and guided strategies (use of angle testers and labels) to identify angles and symmetry within given design, with oral justification.
* Interpret the design brief and identify requirements of design task (highlighting, numbering or underlining strategies).
* Using chosen software application, apply new understandings to create individual robot design in alignment with design brief.
* After their first draft, use feedback strategies (PMI) for peer evaluation of design.
* Reflect upon peer evaluation (learning log) and apply changes to enhance their design.
* Create an observation of student reflection and application.
* Present final design and/or created robot to adult to effectively communicate and justify design choices, including identification of angles and symmetry in design.
 | Section 6 of the *Disability Standards for Education* (The Standards for Curriculum Development, Accreditation and Delivery) states that education providers, including class teachers, must take reasonable steps to ensure a course/program is designed to allow any student to participate and experience success in learning. The *Disability Standards for Education 2005* (Cwlth) is available from: <www.ag.gov.au> select Human rights and anti-discrimination > Disability standards for education. | **ICT** * digital cameras
* ICT software
* computers and printers

**Equipment*** angle testers
* 2-D shapes
* learning log
* word wall
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| Use feedback |
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| Ways to monitor learning and assessment | Teachers meet to collaboratively plan the teaching, learning and assessment to meet the needs of all learners in each unit.Teachers create opportunities for discussion about levels of achievement to develop shared understandings; co-mark or cross mark at key points to ensure consistency of judgments; and participate in moderating samples of student work at school or cluster level to reach consensus and consistency. |
| Feedback to students | Teachers strategically plan opportunities and ways to provide ongoing feedback (both written and informal) and encouragement to students on their strengths and areas for improvement.Students reflect on and discuss with their teachers or peers what they can do well and what they need to improve.Teachers reflect on and review learning opportunities to incorporate specific learning experiences and provide multiple opportunities for students to experience, practise and improve. |
| Reflection on the unit plan | Identify what worked well during and at the end of the unit, including:* activities that worked well and why
* activities that could be improved and how
* assessment that worked well and why
* assessment that could be improved and how
* common student misconceptions that need, or needed, to be clarified.
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