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| Previous level’s achievement standard as a starting point of comparison Previous level’s achievement standard as a starting point of comparison **CURRICULUM AREA – Mathematics: Measurement and Geometry *toward* Level 7 Achievement Standard** |
| **VCAA EXAMPLE****Context:**Students cover related content and proficiencies when they engage in learning activities where they:* apply shape decompositions and use grids to illustrate the relationship between areas of triangles, rectangles and parallelograms
* use dynamic geometry software or compass, straight edge and protractor, to create pairs of parallel lines and transversals and identify corresponding, alternate and co-interior (allied) angles, measure and calculate these angles
* use and explain programs to create simple geometric patterns in the plane based on triangles and quadrilaterals

**Content Descriptions:**Establish the formulas for areas of rectangles, triangles and parallelograms and use these in problem solving [(VCMMG258)](http://victoriancurriculum.vcaa.vic.edu.au/Curriculum/ContentDescription/VCMMG258)Identify corresponding, alternate and co-interior angles when two straight lines are crossed by a transversal (VCMMG264)Design and implement mathematical algorithms using a simple general purpose programming language [(VCMNA254)](http://victoriancurriculum.vcaa.vic.edu.au/Curriculum/ContentDescription/VCMNA254) |
| **Mathematics Level 6 Achievement Standard**  | **Example of Indicative Progress toward Level 7 Achievement Standard** | **Mathematics Level 7 Achievement Standard** |
| By the end of Level 6:* Students relate decimals to the metric system and choose appropriate units of measurement to perform a calculation
* They solve problems involving time, length and area, and make connections between capacity and volume. Students interpret a variety of everyday timetables.
* They solve problems using the properties of angles and investigate simple combinations of transformations in the plane, with and without the use of digital technology.
* Students construct simple prisms and pyramids.
 | In **Mathematics**, indicative progression towards the Level 7 achievement standard may be when students:* find the areas of parallelograms
* identify corresponding angles formed by transversals of parallel lines, measure one angle and calculate the rest
* use a program to create simple geometric patterns in the plane
 | By the end of Level 7:* Students use formulas for the area and perimeter of rectangles.
* They classify triangles and quadrilaterals and represent transformations of these shapes on the Cartesian plane, with and without the use of digital technology.
* Students name the types of angles formed by transversals crossing parallel lines and solve simple numerical problems involving these lines and angles.
* They describe different views of three-dimensional objects, and use models, sketches and digital technology to represent these views. Students calculate volumes of rectangular prisms.
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| Previous level’s achievement standard as a starting point of comparison Previous level’s achievement standard as a starting point of comparison **CURRICULUM AREA – Mathematics: Measurement and Geometry *toward* Level 8 Achievement Standard** |
| **VCAA EXAMPLE****Context:**Students cover related content and proficiencies when they engage in learning activities where they:* form estimates for *π* using empirical data and use these to calculate circumferences of other circles
* investigate the use of geometric shapes and related measures in handy-work, art, design, building and architecture
* use congruence of triangles to deduce properties of quadrilaterals and demonstrate these using dynamic geometry software

**Content Descriptions:**Measure, calculate and compare elapsed time (VCMMG227)Solve problems involving duration, including using 12- and 24-hour time within a single time zone (VCMMG290) |
| **Mathematics Level 7 Achievement Standard**  | **Example of Indicative Progress toward Level 8 Achievement Standard** | **Mathematics Level 8 Achievement Standard** |
| By the end of Level 7:* Students use formulas for the area and perimeter of rectangles.
* They classify triangles and quadrilaterals and represent transformations of these shapes on the Cartesian plane, with and without the use of digital technology.
* Students name the types of angles formed by transversals crossing parallel lines and solve simple numerical problems involving these lines and angles.
* They describe different views of three-dimensional objects, and use models, sketches and digital technology to represent these views.
* Students calculate volumes of rectangular prisms.
 | In **Mathematics**, indicative progression towards the Level 8 achievement standard may be when students:* develop approximations for *π* and use these to calculate the circumference of a circle
* explain practical uses of triangles, parallelograms, rhombuses, kites and circles and related measures in art, design, building and architecture.
 | By the end of Level 8:* Students convert between units of measurement for area and for volume. They find the perimeter and area of parallelograms, rhombuses and kites.
* Students name the features of circles, calculate circumference and area, and solve problems relating to the volume of prisms.
* They make sense of time duration in real applications, including the use of 24-hour time.
* Students identify conditions for the congruence of triangles and deduce the properties of quadrilaterals.
* They use tools, including digital technology, to construct congruent shapes.
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| Previous level’s achievement standard as a starting point of comparison Previous level’s achievement standard as a starting point of comparison **CURRICULUM AREA – Mathematics: Measurement and Geometry *toward* Level 9 Achievement Standard** |
| **VCAA EXAMPLE****Context:**Students cover related content and proficiencies when they engage in learning activities where they:* investigate surface area and volume of rectangular prisms and cylinders and relate surface area to the net for these objects
* explore proofs, including animated proofs, for Pythagoras theorem and apply the theorem to solve practical problems involving right angles triangles

**Content Descriptions:**Calculate the surface area and volume of cylinders and solve related problems [(VCMMG313)](http://victoriancurriculum.vcaa.vic.edu.au/Curriculum/ContentDescription/VCMMG313)Investigate Pythagoras’ Theorem and its application to solving simple problems involving right angled triangles [(VCMMG318)](http://victoriancurriculum.vcaa.vic.edu.au/Curriculum/ContentDescription/VCMMG318) |
| **Mathematics Level 8 Achievement Standard**  | **Example of Indicative Progress toward Level 9 Achievement Standard** | **Mathematics Level 9 Achievement Standard** |
| By the end of Level 8:* Students convert between units of measurement for area and for volume.
* They find the perimeter and area of parallelograms, rhombuses and kites.
* Students name the features of circles, calculate circumference and area, and solve problems relating to the volume of prisms.
* They make sense of time duration in real applications, including the use of 24-hour time. Students identify conditions for the congruence of triangles and deduce the properties of quadrilaterals.
* They use tools, including digital technology, to construct congruent shapes.
 | In **Mathematics**, indicative progression towards the Level 9 achievement standard may be when students: * construct the net for a cylinder and calculate the corresponding surface area
* explain a proof of Pythagoras theorem
 | By the end of Level 9:* Students solve measurement problems involving perimeter and area of composite shapes, surface area and volume of rectangular prisms and cylinders, with and without the use of digital technology.
* They relate three-dimensional objects to two-dimensional representations.
* Students explain similarity of triangles, interpret ratios and scale factors in similar figures, and apply
* Pythagoras's theorem and trigonometry to solve problems involving angles and lengths in right-angled triangles
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| **CURRICULUM AREA – Mathematics: Measurement and Geometry *toward* Level 10 Achievement Standard**Previous level’s achievement standard as a starting point of comparison Previous level’s achievement standard as a starting point of comparison  |
| **VCAA EXAMPLE****Context:**Students cover related content and proficiencies when they engage in learning activities where they:* construct three dimensional images of simple composite objects, and calculate their surface area and volume, such as a cylinder with hemispherical ends
* apply trigonometry to solve problems in building, surveying and navigational contexts with real data obtained from the context or a suitable secondary source
* use a program or software to transform sets of points in the plane corresponding to simple geometric shapes

**Content Descriptions:** Solve problems involving surface area and volume for a range of prisms, cylinders and composite solids (VCMMG343)Solve right-angled triangle problems including those involving direction and angles of elevation and depression (VCMMG346)Implement algorithms using data structures in a general-purpose programming language[(VCMNA334)](http://victoriancurriculum.vcaa.vic.edu.au/Curriculum/ContentDescription/VCMNA334) |
| **Mathematics Level 9 Achievement Standard**  | **Example of Indicative Progress toward Level 10 Achievement Standard** | **Mathematics Level 10 Achievement Standard** |
| By the end of Level 9:* Students solve measurement problems involving perimeter and area of composite shapes, surface area and volume of rectangular prisms and cylinders, with and without the use of digital technology.
* They relate three-dimensional objects to two-dimensional representations.
* Students explain similarity of triangles, interpret ratios and scale factors in similar figures, and apply Pythagoras's theorem and trigonometry to solve problems involving angles and lengths in right-angled triangles.
 | In **Mathematics**, indicative progression towards the Level 10 achievement standard may be when students:* calculate area and volume of simple composite shapes
* apply trigonometry to solve problems involving angles of elevation and depression
* use an array to represent and implement a transformation in the plane of three points that correspond to the vertices of a triangle
 | By the end of Level 10:* Students solve and explain surface area and volume problems relating to composite solids.
* They use parallel and perpendicular lines, angle and triangle properties, similarity, trigonometry and congruence to solve practical problems and develop proofs involving lengths, angles and areas in plane shapes.
* They use digital technology to construct and manipulate geometric shapes and objects, and explore symmetry and pattern in two dimensions.
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