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| Strand: Space | | Topic: Location, direction and movement |
| Foundation Level: Level statement  Students are developing notions of shape, location, direction and movement. | | |
| Example learning outcomes  Students position or locate objects in response to directions.  Students use an awareness of locations to follow the directions for daily routines.  Students recognise familiar places when approaching from different directions. | | |
| Elaborations — To support investigations that emphasise thinking, reasoning and working mathematically | | |
| Students know:  a range of different actions to respond to everyday language for movement  signs require different movement responses  familiar locations from different viewpoints and approaches. | Students may:  follow directions and/or cues, such as up, down, to, from, on, under, open, shut, in, out, off, on top of, upside down, in a range of familiar contexts  (e.g. get communication book in or out of bag, get in or out of the car, place book on the table, turn lights on or off, open or shut eyes, open or  shut a cupboard, move the joystick on an electric wheelchair)  follow practised routines relevant to different aspects of their lives (e.g. travelling to school, community centre, leisure activities)  respond to prompts to use objects the ‘right way up’ (e.g. hold the puzzle piece with the picture on top, hold a bag the right way up to open it,  hold a cup or jug the right way to hold liquid)  recognise signs that identify movement, pathways and locations (e.g. signs for exit, push or pull; icons for no entry, walk or don’t walk, toilet;  positional or directional arrows in public places)  recognise familiar locations from different viewpoints (e.g. approaching a picnic table from the car park or the toilet block; approaching the classroom  from the main entrance, playground or toilet block)  participate in action songs or rhymes that require signs, gestures or tactile prompts  participate in obstacle courses that involve finding locations and exploring movements  follow pathways involving turns (e.g. cars in tracks, follow the leader, negotiate a bike path)  follow set pathways around familiar environments (e.g. shopping centres, the school, the classroom)  plan pathways involving turns (e.g. pushing objects through sand, travelling from the classroom to the toilet)  position items for specific purposes (e.g. storing equipment, setting a table, placing items in a refrigerator, locating and using the cursor on a  computer screen). | |

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| Level 1: Level statement  Students identify some obvious properties that distinguish 3D shapes and objects and 2D shapes, and understand that these properties are constant. They describe properties using simple geometric terms and construct representations of shapes, paying attention to the number of sides or corners and the shapes of faces.  Students identify and describe locations and the positions of objects relative to known landmarks within familiar environments. They give directions that guide others through those environments, follow directions to move between one location and another and identify alternative pathways between locations. | | |
| Core learning outcome: S 1.2  Students follow and give simple directions to move through familiar environments and locate and place objects in those environments. | | |
| **Elaborations — To support investigations that emphasise thinking, reasoning and working mathematically** | | **Core content** |
| Students know:  language associated with location, direction and movement  how to use the language associated with location, direction and movement to give directions for moving through, and for locating and placing objects in, familiar environments  how to interpret the language associated with location, direction and movement to follow directions to move through, and to locate and place objects in, familiar environments. | Students may:  identify and list words that are used to describe position and movement  identify frequently visited locations and describe them in relation to other known locations (e.g. the toilets are near the library)  identify a variety of pathways to and from frequently visited locations  identify and list the key components of directions (e.g. starting points, finishing points, changes of direction, possible pathways)  use everyday language to give directions  make ‘mind pictures’ of, and describe, possible pathways to and from known locations  follow and give directions to different locations from the same starting point  follow and give directions to the same location from different starting points  place an object in the classroom or school ground and give directions to their peers to locate it  follow others’ directions to locate an object in the classroom or school ground  monitor responses to directions they give and adjust as necessary  combine gestures with the language of location, direction and movement as required  give reasons for the language selected and the style (verbal or non-verbal) used to give directions  interpret positional signs (text or arrows) as required  suggest alternative, safe pathways to the same location using the language associated with position, location, direction and movement  compare the similarities and differences in the language and type of directions needed for different purposes (e.g. the number of steps in a treasure hunt)  change directions when travelling (e.g. when turning, indicate directional change with gestures)  use ‘mind pictures’ to visualise pathways for locating or placing objects  evaluate the ease with which directions could be followed, and the appropriateness of the directions for different people; modify directions as necessary. | Location and movement  language   * position (on, between, beside, near, before, after …) * direction (over, under, up, down, left, right … ) * movement (forwards, backwards, sideways …) * non-verbal   + signs, symbols (static)   + gestures (dynamic)   ‘mind pictures’ of familiar pathways  alternative pathways  Direction and angle  language   * turns (change in direction) |
| Investigations should occur in a range of contexts. For example, students could investigate:  possible pathways within the classroom, school campus or local venues  designs for a class or school mural with images and objects placed in different positions  possible routes through obstacle courses they have developed  the location of ‘treasures’ by following treasure maps. | | |

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| Level 2: Level statement  Students sort 3D shapes and objects by identifying common properties, including those that distinguish them from 2D shapes. They identify and match drawings, pictures and other representations of 3D shapes and objects from different viewpoints and orientations. They investigate nets of some shapes by unfolding and refolding packages.  Students recognise that maps and plans are representations of environments and use these to follow or give directions related to pathways and the location of objects. They interpret and use alphanumeric grids to describe locations. They create simple sketches that represent parts of familiar environments and recognise the relative size and proximity of objects and locations. | | |
| Core learning outcome: S 2.2  Students interpret and create simple maps, plans and grids to follow and give directions, and to locate or arrange places or objects. | | |
| **Elaborations — To support investigations that emphasise thinking, reasoning and working mathematically** | | **Core content** |
| Students know:  maps, plans and grids are representations of aspects of the environment  how to arrange places or objects to create simple maps, plans and grids  how to interpret simple maps, plans and grids to locate places or objects  language associated with location, direction and movement  how to use the language of location, direction and movement to give directions and to locate or arrange places or objects  how to interpret the language of location, direction and movement to follow directions and to locate or arrange places or objects. | Students may:  identify and list language that could be used to give directions or to locate or arrange places and objects  give and follow directions to familiar places in the school environment (e.g. library, tuckshop)  give reasons for the choice of language used to describe movements and directions  determine the view to be represented when using a simple map, plan or grid to give directions, or to locate or arrange places or objects  create simple maps, plans and grids  identify different ways to represent movement on maps, plans and grids  provide representations of pathways on maps, plans or grids for others to follow  modify representations of pathways using feedback from others and evaluate effectiveness of changes  visualise and follow described pathways  evaluate the ease of interpreting directions given by peers  identify what happens when directions are changed to include different amounts of turn or when turns are rotated when locating objects or places (e.g. clockwise instead of anticlockwise, moved right instead of left)  visualise and create representations of alternative pathways to the same location  identify and locate key features (e.g. fire hydrants, doorways) on maps to assist interpretation  arrange places or objects on maps, plans or grids in response to directions  compare and make judgments about the relative sizes of objects, proximity to other objects and distances involved when locating or arranging places or objects on maps, plans or grids  arrange icons to represent specific objects or locations and decide whether icons assist interpretations  list and arrange possible icons for directions, such as quarter or three-quarter clockwise turns, that enhance interpretation of movement using a grid  check that others interpret the map as intended and make modifications as necessary  represent different viewpoints and check the interpretations of others  interpret and follow maps, plans and grids developed by others that use different viewpoints  identify the intended purpose for the representation. | Location and movement  simple maps  sketches of simple plans  (e.g. rooms)  relative size of objects and locations  non-labelled grids  alphanumeric grids (e.g. B3)  movement (e.g. paces, steps, grid spaces)  different viewpoints (above, ‘bird’s- eye view’, front, behind, side)  alternative pathways  Direction and angle  language   * full, half, quarter and  three-quarter turns * left and right turns * clockwise, anticlockwise |
| Investigations should occur in a range of contexts. For example, students could investigate:  diagrammatic representations of gymnastic, dance or march routines for a group performance  representations of pathways for school activities, such as fun runs or treasure hunts  representations of journeys made by fictional characters, such as the Gingerbread Man or Shrek  a visitors’ guide for the school art show or fete. | | |

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| Level 3: Level statement  Students identify and visualise the geometric properties that define and distinguish families of prisms, cylinders, spheres, cones and pyramids. They recognise and describe the properties that distinguish trapeziums and rhombuses from other quadrilaterals, as well as the properties that distinguish different groups of triangles. They describe the properties of shapes using terms such as parallel, congruent, symmetrical and other terms related to angles. They draw shapes using various conventions to indicate particular geometric properties.  Students describe locations and directions with reference to the four compass points and grid references displayed on simple, authentic maps and plans. They interpret the symbols used on maps by referring to the keys and legends and know that most maps are orientated to the north. | | |
| Core learning outcome: S 3.2  Students interpret and create maps and plans using a range of conventions, describe locations and give directions using major compass points, angles and grids. | | |
| **Elaborations — To support investigations that emphasise thinking, reasoning and working mathematically** | | **Core content** |
| Students know:  conventions for maps, plans and grids  how to use conventions to create maps and plans  how to use conventions to interpret maps and plans  the four major compass points  the relationship between the amount of turn and the change in direction  how to describe locations using major compass points, angles and grids  how to give directions using major compass points, angles and grids. | Students may:  describe the purposes of conventions for maps and plans  identify and interpret conventions on maps and plans and use these to describe locations or give directions  use grid references for regions (squares) or points (exact location) and major compass points to locate places of interest on maps and plans  visualise, follow and give directions to places of interest or importance  provide directions for alternative pathways to specific locations when approaching those locations from different major compass points  identify and give directions to places close to specified locations by referring to compass points and angles to identify changes in direction and amount of turn  create maps and plans for particular purposes using conventions and give reasons for choices  evaluate the use of different conventions when maps are interpreted and used. | Location and movement  combinations of alphanumeric grids and maps (e.g. local area)  plans (e.g. school layout)  conventions   * keys and legends (symbols and explanations of the symbols) * grid references (regions and/or points) * orientation to north   Direction and angle  the four compass points  (N, S, E, W)  connection between compass points and the amount of turn |
| Investigations should occur in a range of contexts. For example, students could investigate:  the creation of maps to assist the emergency evacuation of their home or school  street maps of their local area to plan routes for fun runs or walkathons  the location of speciality shops and amenities in shopping centres  the design of tourist maps for visitors to their local area. | | |

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| Level 4: Level statement  Students analyse the geometric properties that define and distinguish families of polygons and their subgroups. They analyse and describe groups of 3D shapes, such as the Platonic solids. They use the properties of prisms and pyramids to identify other shapes belonging to those groups. They analyse and classify shapes according to criteria including rotational symmetry and perpendicular lines or faces, and measure angles in degrees using protractors.  Students interpret maps of the world, describing the location of the equator and other key lines of reference. They describe how the lines of latitude and longitude relate to the equator and the poles. They refer to the eight compass points or angle of turn when giving directions. They use simple linear scales to estimate distance on maps and plans. | | |
| Core learning outcome: S 4.2  Students interpret maps and plans with reference to conventions including latitude and longitude for maps, and describe movements using compass points and distance. | | |
| **Elaborations — To support investigations that emphasise thinking, reasoning and working mathematically** | | **Core content** |
| Students know:  conventions for maps and plans  scale proportionally enlarges or reduces measurements  lines of latitude and longitude which are key lines of reference  how to interpret maps and plans with reference to conventions  the eight major compass points  the relationship between the amount of turn and the change in direction  how to describe movements using compass points and distance. | Students may:  locate and identify key lines of reference  describe the purpose of key lines of reference  compare various locations relative to key latitudes and longitudes (e.g. Brisbane is south of the Equator and east of Greenwich)  use conventions, including scale and coordinates, to find locations and describe pathways  use simple scale to determine the relative distances between points  describe movements between locations using distance and compass points, angle as a difference in direction (e.g. East/South is 90°), estimates of turn in degrees (Facing north, turn 45° to face north-west),  follow directions involving conventions, direction and angle. | Location and movement  conventions   * simple scale on maps (linear form or 1 cm:1 km) * coordinates   + grid references   + movement between grid reference points * latitude and longitude   + key lines of reference (prime meridian, equator)   + polar limits   maps   * flat maps * globes   plans (e.g. shopping centre)  Direction and angle  eight compass points (N, NE, E, SE, S, SW, W, NW)  connection between the eight compass points and the amount  of turn  angle as a difference in direction  estimation and measurement of angles in degrees |
| Investigations should occur in a range of contexts. For example, students could investigate:  climatic zones and geographical regions  alternative pathways around venues such as amusement parks  camping areas suitable for accommodating a large group for an extended period of time (e.g. orientation of camp sites, distance to amenities and activity areas)  maps for treasure hunts for use at school fairs or fetes  simple orienteering courses, such as ‘Hunt the coin’. | | |

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| Level 5: Level statement  Students investigate the properties of shapes, including congruence and similarity, and identify shapes embedded within irregular shapes to assist with the calculation of areas. They interpret and draw plans and elevations with attention to suitable scales, depth and perspective, and use geometric tools to assist with the construction of shapes and angles.  Students use the conventions of mapping, including latitude and longitude, to interpret and describe movements and locations on maps of the world. They calculate distance on maps and dimensions on plans by referring to scales expressed as simple ratios. They give or follow directions expressed as compass bearings and distance to move around a local environment. | | |
| Core learning outcome: S 5.2  Students interpret maps and globes referring to latitude and longitude, interpret and describe plans that use scale and describe movements using compass bearings and distance. | | |
| **Elaborations — To support investigations that emphasise thinking, reasoning and working mathematically** | | **Core content** |
| Students know:  latitude indicates position north or south of the 0° latitude (the equator)  longitude indicates position east or west of 0° longitude (Greenwich) measured along the equator  how to interpret maps and globes using latitude and longitude  how to interpret scale on maps and plans  how to describe movements using compass bearings and distance. | Students may:  read latitude and longitude in whole degrees on maps and globes  use conventions to find locations on maps and apply scale to calculate distances  represent locations using conventions  use compass bearings to describe directions of travel  use scale to interpret plans  calculate the actual distances and sizes represented on plans  identify the orientation of maps and plans  describe locations of various features on maps. | Location and movement  conventions   * scale on maps expressed as a simple ratio (e.g. 1:10; 1:1000 ) * coordinates   + latitude and longitude expressed in whole degrees   + location of points and places using latitude and longitude * distance and bearing (local environment)   maps   * flat maps including world, atlas, street directory, and orthophoto * globes   simple floor plans with scale  Direction and angle  bearings in whole degrees (measured clockwise from north)  estimation of bearings in degrees  application of scales to maps to find actual distances |
| **Investigations should occur in a range of contexts. For example, students could investigate:**  orienteering courses in local parks or recreation areas  itineraries for road trips within Australia considering the location of points of interest, time available and distance to be travelled  construction or environmental plans  air routes within Australia. | | |

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| Level 6: Level statement  Students make generalisations about shapes, lines and angles and develop chains of reasoning connecting related properties that can be used to solve geometric problems. They communicate their solutions by using geometric terms and symbols supported by appropriate representations.  Students analyse a range of authentic maps, globes and plans, identifying the information that guides interpretation. They understand why time varies across the world, and refer to international time zones, rotation of the Earth, and position on the Earth’s surface to explain or calculate dates and times in specific places. | | |
| Core learning outcome: S 6.2  Students interpret maps and plans using standard conventions, provide directions based on bearings and distance, and use longitude to explain time differences between  major locations. | | |
| **Elaborations — To support investigations that emphasise thinking, reasoning and working mathematically** | | **Core content** |
| Students know:  the standard conventions used on maps and plans  how to interpret maps and plans using standard conventions  how to give directions based on bearings and distance  the relationship between lines of longitude and time differences. | Students may:  use scale to interpret plans  explain the relationship between whole degrees and minutes of arc  use scale to enlarge or reduce shapes within plans or regions within maps  draw plans using conventions and identify the orientation  apply scale to calculate distances represented on maps or measurements on plans  interpret maps and globes using latitude and longitude in whole and fractions of degrees to identify locations and travel pathways  provide directions based on compass bearings and distance  identify key referents for international time zones  explain time differences between worldwide locations based on changes in longitude. | Location and movement  conventions   * scale on maps expressed as ratio (e.g. 1:25; 1:40) * coordinates   + fractions of degrees expressed as minutes (mentally and on scientific calculators)   + latitude and longitude expressed in degrees and minutes * scale on floor plans expressed in millimetres   key referents for international time zones   * Greenwich Mean Time (GMT) or Universal Time Coordinates (UTC) * International Date Line   link between longitude and time  distance and bearing  Direction and angle  maps (local environment) with a given scale  navigational instructions based on distance and bearings (using protractors) |
| **Investigations should occur in a range of contexts. For example, students could investigate:**  suitability of a specific site for a given construction or environmental plan  plans for Do It Yourself projects  travel itineraries for around the world adventures  global positioning devices  simulated nautical navigation for trips in the local area  possible courses for orienteering on mountain bike or foot. | | |