

Mathematics in the New Zealand Curriculum Second Tier

Strand: Geometry

Thread: Position and Orientation

level: Two

Achievement Objective:

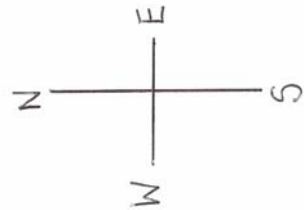
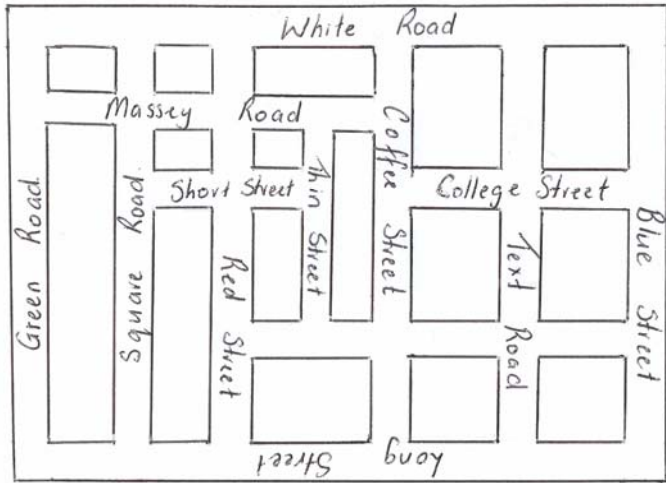
- Create and use simple maps to show position and direction.
- Describe different views and pathways from locations on a map.

Exemplars of student performance:

Exemplar One:

The student is following instructions to get to a location. The student completes a variety of tasks related to the map provided below. The student draws the path that they take on their map.

1. You start at the Northern end of Long St, travel East along Green Rd, go South along Massey Rd to 2nd intersection, do a $\frac{1}{4}$ turn anti-clockwise and walk straight ahead. What is the name of the road that you end up on when you get to the end of Red Street? The student correctly responds White Road.
2. You are standing at the intersection of Text Rd and College Street, they head North along College Street, at the intersection you do a $\frac{1}{4}$ turn anti-clockwise and then continue until the next intersection where they do a $\frac{1}{4}$ turn clockwise. What is the street you come to at the end of this road? The student correctly responds Red Street.
3. The student is asked to provide instructions to enable a person standing at the corner of Long street and Square Road to get to the corner of Coffee Street and College Street.



Using a map of the school, playground or classroom, students can create instructions for others to follow in order to locate a hidden item. This task is easier to monitor as everyone has the same map which makes it easier to check that the instructions made and the answer is correct whereas the following task is more difficult to check as you may not be familiar with the students' maps. The student then draws their own map of the streets around their house to their school and creates questions similar to the ones above for other students to complete.

Exemplar Two: (need a local street map with places identified on it such as the hospital, school, airport etc)

The student is to use the map to determine and describe some different pathways that are available to get to the specified location. Problems of finding the shortest or longest route from one place to another give the instructions for movement a purpose. Extra information could be added e.g. What is the quickest route from the school to the video store if you have to go to the library first and then to the dairy.

Using a map with places indicated on it, students can answer questions such as “From where I am standing the fire station is on my left, the petrol station is on my right and I am opposite the bank. Where am I? Students could also create their own statements for I am lost scenarios, “where am I?”

Important Teaching ideas (working at):

Students learning the four main compass points can experience some difficulty remembering the correct order of the points. Mnemonics, such as “Never Eat Soggy Weetbix” can be used to help students remember the correct order. Directional language such as clockwise and anti-clockwise are also introduced at this level. Connecting these turns to the action of the hour, minute, or second hand on an analogue clock needs deliberate teaching in the age of digital time.

At this stage students should understand angles by relating them to turns. Students may have four different ways of viewing an angle; the area between two lines, the corner where the 2 lines meet, the two lines, the amount of turn. The concept of an angle needs to be introduced as an amount of a rotation (turn). See Book 9: Teaching Number through Measurement, Geometry, Algebra and Statistics, Ministry of Education 2004 for activities to develop an understanding of this concept.

Tasks relating to finding different pathways can be extended by asking the students to determine the shortest route. Use string, or a piece of paper along side rulers to measure and compare the different routes at this level. The string is useful when the route is curved. Contextualise the problems in real life scenarios such as going to the corner dairy from home, driving from Palmerston North to Napier, organising the cross-country track, or showing how pre-European Maori would get from one place to another when New Zealand was bush covered.

At this level when drawing a map the essential features of the map need to be emphasised. The scale is not important, where as where places are positioned on the map is relatively important. The sequence of landmarks needs to be correct. The exploration of the features of a street map leads on to level three. E.g. Street maps have coordinates, why?

Useful Resources:

Create and use simple maps to show position and direction

- Figure it Out, Geometry, level 2-3. Learning Media, Wellington. 2000. p 18, p20& 21
- Figure it Out, Geometry, level 3-4. Learning Media, Wellington. 2000. p 20, 24
- <http://nlvm.usu.edu/en/nav/index.html> (National Library of Manipulates web site, Ladybird Mazes).
- <http://www.nzmaths.co.nz/geometry/Position/Rescue.aspx>
- <http://www.nzmaths.co.nz/geometry/Position/robots.aspx>
- Figure it Out, Under the Sea, level 2-3, p 13
- Book 9: Teaching Number through Measurement, Geometry, Algebra and Statistics. Ministry of Education. 2004. p22 or <http://www.nzmaths.co.nz/numeracy/2006numPDFs/pdfs.aspx>

Describe different views and pathways from locations on a map.

- <http://www.figurethis.org/challenges/c06/challenge.htm>, (Figure this web site, oh, which way do I go?)
- <http://www.learner.org/teacherslab/math/geometry/shape/taxicab/index.html> (Taxi Cab Treasure)