Mapping Sydney Metro Northwest features across the North West region of Sydney landscape

Key Learning Area	Unit or lesson title and main focus questions	Most appropriate level and suggested number of lessons
Mathematics Geography	**Mapping Sydney Metro Northwest features across the North West region of Sydney landscape** How will the infrastructure of the Sydney Metro Northwest fit into my community?	**Stage 2–3** 2–3 lessons

Teacher briefing

Students consider and discuss the maps and diagrams of the Sydney Metro Northwest. They map features such as tunnels, the skytrain, train stations, car parks, bus terminals and schools using a scale and a grid. They create an aerial view artwork from this mapping activity, and create an interactive board game using the map coordinates, directions and features.

These activities help students answer the focus question: How will the infrastructure of the Sydney Metro Northwest fit into my community?

Requirements for these lessons

- Interactive whiteboard
- Computers or laptops
- Internet access
- Small canvases (one per student)
- Suitable art media (paint, charcoal, pastels, paint, pencils)
- Laminated hard copies of modified Sydney Metro Northwest project plan maps
- Appropriate Mathematics materials (counters, dice).

Assessment

The interactive Sydney Metro Northwest map board games can be used to assess students' ability to meet the Mathematics K–10 and Geography K–10 outcomes. Board game activities also provide opportunities for students to peer assess.

Key terms and vocabulary

Sydney Metro Northwest, map terminology: aerial map, coordinates, directions North, South, East and West.

Web links

Sydney Metro interactive map
https://www.sydneymetro.info/map/interactive-map

North West region Google map
http://maps.google.com.au/maps?q=Castle+Hill,+New+South+Wales&z=13

A list and explanation of different group discussion strategies
http://gsi.berkeley.edu/teachingguide/sections/groupwork.html#structured

Sydney Metro Northwest website – construction map
https://www.sydneymetro.info/northwest/construction-overview

Syllabus links

Mathematics K–10

(MA2–1WM) uses appropriate terminology to describe, and symbols to represent, mathematical ideas

(MA3–1WM) describes and represents mathematical solutions in a variety of ways using mathematical terminology and some conventions

(MA2–17MG) uses simple maps and grids to represent position and follow routes, including using compass directions

(MA3–17MG) locates and describes location on maps using a grid-reference system.

Geography K–10

Stage 2 – Places are similar and different

(GE2–4) acquires and communicates geographical information using geographical tools for inquiry.

Stage 3 – Factors that shape places

(GE3–4) acquires, processes and communicates geographical information using geographical tools for inquiry.

Learning experiences

Step 1 – Class discussion

Displaying the Sydney Metro Northwest Interactive map on the interactive whiteboard, teacher discusses important aspects of interactive and aerial maps. This discussion focuses on how aerial maps assist people to understand location and position. Class views the Interactive map and aerial maps.

See interactive map at: **https://www.sydneymetro.info/map/sydney-metro-interactive-train-map**

Students may use some of the following terms in the discussion to describe various forms and aspects of aerial maps:

- 'Bird's eye view' – (angled at 40 degrees rather than straight down)
- 'Overhead view'
- 'Direct down' or straight down maps or satellite images
- Zooming
- 'Fly-through' or 'fly-over' animation
- Helicopter view
- Relief maps
- Terms from video game maps: top-down, overhead or over-world views, first person perspective.

Use discussion strategies such as, 'Think Pair Share', 'Think Pair Share Square' and 'Roundtable' as a guide to stimulate class discussion and interact with the maps. (See web links). Use the following questions as a guide:

- How do aerial maps assist us?
- Why are they important?
- How could we locate our school on these maps?
- What Sydney Metro Northwest station is located closest to our school? How can we find this out?
- Where are the skytrain and tunnels located on the Sydney Metro Northwest route? How will we find out?
- How long is the new Sydney Metro Northwest? How can the scale be used to determine this?
- In what direction does the railway run? How can we describe the location of key Sydney Metro Northwest features?
- What does the legend on the map tell us? Can this legend be extended?

Step 2 – Class activity

Create a grid and determine Sydney Metro Northwest station coordinates.

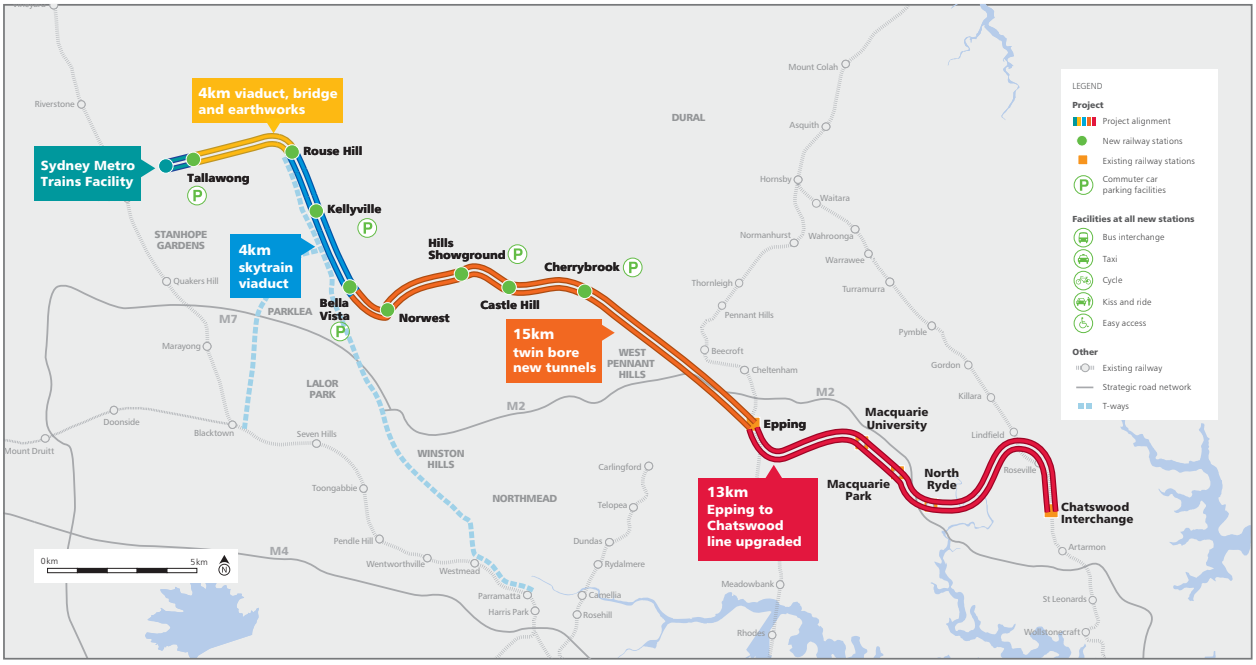

Figure 7: Sydney Metro Northwest route map.

Step 3 – Class activity

As a class using the Sydney Metro Northwest route map (see web links) and the interactive whiteboard, create and use a grid to determine the coordinates of each new Sydney Metro Northwest station. There are eight new stations: Tallawong, Rouse Hill, Kellyville, Bella Vista, Norwest, Hills Showground, Castle Hill and Cherrybrook. A simple grid can be created in a Word document by adding a table over the top of the Sydney Metro Northwest route map. Coordinates can be added to the grid by using text boxes.

Look at the compass feature on an iPhone or iPad and add a compass rose to the map. Discuss and determine the directions to the Sydney Metro Northwest station closest to the school.

Introduce the language used to explain directions on the map, such as North, North West, North East. Add arrows to the map representing North, North West region, South and so on.

Step 4 – Group activity (two – three students)

Plot the school and Sydney Metro Northwest above and below ground rail.

- Using Google Maps and computers students plot the school onto the Sydney Metro Northwest route map. (See web links). Students can use laptops, computers or hard copies of the class modified Sydney Metro Northwest project map
- Using the Sydney Metro Northwest construction map, students add to the Sydney Metro Northwest map legend and plot the above and below ground rail. (See web links)
- Using the scale on the Sydney Metro Northwest route map determine the approximate distance between the school and the closest Sydney Metro Northwest station.

Step 5 – Individual activity

Create a Sydney Metro Northwest aerial artwork.

- Ask students to imagine how the above and below ground Sydney Metro Northwest might look from an aerial perspective
- Using a variety of media and small canvases, students create an artwork depicting an aerial view of part of the Sydney Metro Northwest
- Ask students to think about the different aerial viewpoints discussed in the introduction, and the view of the train, the view of the line, the view of stations, car parks, and people. How could they use an aerial perspective in their artwork?

Step 6 – Group activity (two to four students)

Using modified Sydney Metro Northwest route maps, students create games using appropriate directions, coordinates, grid, legend, scale and metalanguage. The games could be created using laminated hardcopies of the modified Sydney Metro Northwest maps and math materials such as counters and dice.

Ask students to consider an outcome, for example, what is the purpose of the game? Less imaginative students may be encouraged to model their board games on a classic format such as Snakes and Ladders, using dice to travel forward, and penalty squares sending them back, or requiring the player to do something.

Step 7 – Group activity (four students)

Peer assessment and playing the Sydney Metro Northwest map coordinate games. Groups swap games and play the Sydney Metro Northwest map coordinate games. While playing, students peer assess the games using simple pro formas or peer assessment strategies such as 'Two Stars and a Wish' (Choose two excellent aspects of the board game and one wish that would improve it).

Step 8 – Reflection

Teacher selects students to discuss their 'Two Stars and a Wish activity' with the class, reiterating excellent ideas displayed during the creation of the Sydney Metro Northwest map coordinates games.

Teacher references and extension activities

Stage modifications: Stage 3

The activities listed in the extension activities below can be used to modify this learning experience for Stage 3.

Extension activities

Zooming in: students could explore the impact of Sydney Metro Northwest infrastructure on their local area by creating detailed aerial maps that show what Sydney Metro Northwest will look like and where it will fit into their community.

They could use legends, grids, coordinates and compasses. These can be created using iPads and Apps such as MS PowerPoint or paper and art materials.

Environmental Impact Statement 2 documents such as Chapter 16 Visual Impact and Chapter 6 Project Description – Operation (in two parts) have very good maps for this purpose, along with representations of each station precinct that can be used as starting points.

Disclaimer: This site contains information in portable document format (PDF). These files are made available so information is easy to download and is portable. These documents are maintained on the Sydney Metro website for 12 months post construction; therefore some documents are no longer available due to the progress and delivery of the metro line in the northwest of Sydney.