



SURVEYING
C A R E E R S

WORK EXPERIENCE

Support Material Booklet

Tasks and Activities

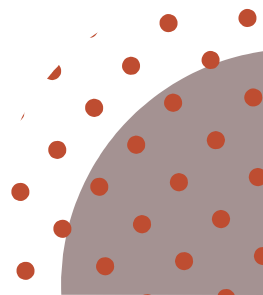


DAY	LEARNINGS
MONDAY	Todays Tasks were: The thing I enjoyed the most about today: What is one question I can ask Tomorrow: What are some interest things I learnt today:
TUESDAY	Todays Tasks were: The thing I enjoyed the most about today: What is one question I can ask Tomorrow: What are some interest things I learnt today:
WEDNESDAY	Todays Tasks were: The thing I enjoyed the most about today: What is one question I can ask Tomorrow: What are some interest things I learnt today:





DAY	LEARNINGS
THURSDAY	Todays Tasks were: The thing I enjoyed the most about today: What is one question I can ask Tomorrow: What are some interest things I learnt today:
FRIDAY	Todays Tasks were: The thing I enjoyed the most about today: What is one question I can ask Tomorrow: What are some interest things I learnt today:





Surveying Quiz Instructions

Welcome to the Surveying Quiz! This quiz consists of 12 multiple-choice questions designed to test your knowledge of key concepts and practices in the field of surveying. Please read each question carefully and select the best answer from the given options.

This quiz is a great opportunity to assess your understanding and reinforce your learning in surveying. Have Fun!

What is the primary purpose of a land survey?

- a) To estimate the value of the property
- b) To determine the boundaries and features of a parcel of land
- c) To assess the environmental impact of a development
- d) To design a landscaping plan

Which instrument is commonly used by surveyors to measure angles and distances on the ground?

- a) Theodolite
- b) Microscope
- c) Seismograph
- d) Altimeter

What is a 'benchmark' in surveying?

- a) A type of survey marker used to indicate the location of a property corner
- b) A reference point with a known elevation used in levelling
- c) A surveyor's tool for measuring horizontal angles
- d) A method for calculating land area





In surveying, what does the term 'traverse' refer to?

- a) The process of creating a topographic map
- b) A series of connected survey lines forming a polygon
- c) The method of establishing property lines
- d) A technique for measuring vertical angles

Which type of survey is used to determine property boundaries?

- a) Cadastral survey
- b) Hydrographic survey
- c) Topographic survey
- d) Photogrammetric survey

What is the main function of a GPS (Global Positioning System) in modern surveying?

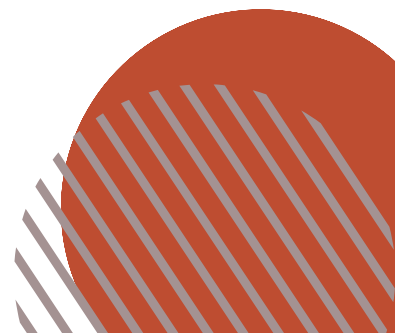
- a) To provide real-time weather updates
- b) To locate and track moving objects
- c) To determine precise coordinates of points on the Earth's surface
- d) To communicate with other surveyors

What is 'triangulation' in the context of surveying?

- a) A method of establishing control points by forming triangles
- b) A way to measure the height of buildings
- c) A process of mapping underwater features
- d) A technique for determining property ownership

Which surveying method involves the use of aerial photographs and satellite images?

- a) Geodetic surveying
- b) Photogrammetry
- c) Hydrographic surveying
- d) Construction surveying





What is the purpose of a 'total station' in surveying?

- a) To conduct environmental assessments
- b) To measure angles and distances electronically
- c) To create detailed landscape designs
- d) To analyse soil samples

What is the term for a survey that measures and maps the features of a body of water?

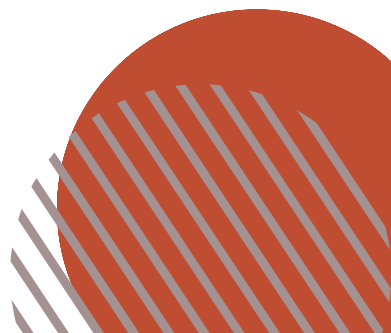
- a) Cadastral survey
- b) Topographic survey
- c) Hydrographic survey
- d) Geodetic survey

What is 'levelling' in surveying?

- a) The process of measuring horizontal distances
- b) The process of determining elevation differences between points
- c) The method of drawing maps
- d) The technique for measuring angles

Which surveying instrument is primarily used to measure vertical angles?

- a) Level
- b) Total station
- c) Clinometer
- d) Distance meter



Case Study: Surveying for a New School Campus

Background

Imagine that a new school is being built on a large piece of land just outside of town. To make sure the land is ready for construction, a team of surveyors is called in. Their job is to gather accurate measurements, mark the boundaries, and identify any features or underground utilities that might impact the construction. This work is essential for ensuring that the new campus buildings, sports fields, and parking areas are placed correctly and safely.

Surveying Goals

The surveying team has several important tasks to complete:

1. **Define Property Boundaries:** They need to confirm the exact property lines, ensuring the school buildings and other structures are within the designated area.
2. **Identify Underground Utilities:** Using tools like *Before You Dig* (BYD), they'll check for pipes, cables, or other services under the ground to avoid accidents during construction.
3. **Set Out Important Points for Construction:** They will create specific markers (survey marks) on the ground to help construction teams know where to build.
4. **Map the Land Features:** This includes identifying trees, slopes, and any natural features to ensure the land is suitable for the planned structures.

The Surveying Process

The surveyors use different types of equipment to measure the land. Here are the steps they take:

1. **Preparation:** Before starting, the team uses *Six Maps* and *SCIMS* (Survey Control Information Management System) to review existing information about the area. This gives them a base map with previous survey points and important boundaries.
2. **On-Site Surveying:**
 - **Marking Boundaries:** Using tools like GPS and total stations (a type of laser-measuring device), the surveyors precisely measure and mark the school property boundaries. They place **permanent survey marks** that will remain even after the construction is complete.
 - **Identifying Utilities:** To prevent any accidents, they use the *Before You Dig* (BYD) service to locate underground utilities. This is especially important near the school's planned sports field and car park.

3. **Setting Out Control Points:** The team places markers around the land that builders will use to guide the location of buildings, roads, and other structures.
4. **Recording and Mapping:** After completing the measurements, the surveyors create a detailed map of the site. This map shows the boundaries, key points for construction, and any natural features or obstacles.

Challenges

During their work, the surveyors face a few challenges:

- **Rugged Terrain:** Some parts of the land are uneven, making it harder to set up equipment.
- **Weather:** Rainy conditions make it difficult to see long distances and cause the ground to be slippery.
- **Access to Information:** Some older records are unclear, so the team has to carefully verify the information they gather with what's available online.

Outcome

After completing the survey, the surveyors hand over a detailed report to the construction team. This includes:

- A boundary map to ensure the school is built within the correct area.
- Locations of utilities to prevent accidental damage.
- Control points for precise construction.
- Recommendations for any necessary land adjustments, like leveling certain areas or removing obstacles.

With the survey complete, the builders are ready to start construction, confident that they have accurate data to work from. The new school campus can now be built safely, efficiently, and without unnecessary delays.

Discussion Questions

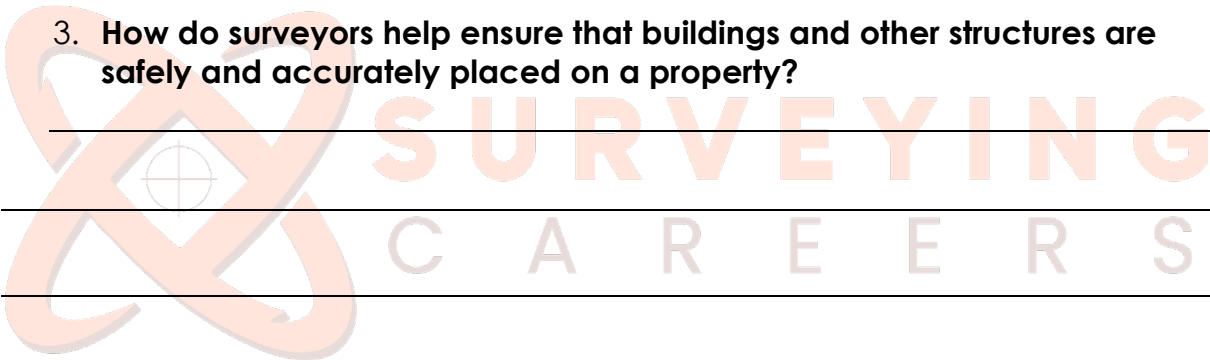
1. **Why is it important for surveyors to identify underground utilities before construction begins?**

.....

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2. What tools and resources did the surveyors use to make their job easier? How might these tools be helpful in other types of construction projects?

3. How do surveyors help ensure that buildings and other structures are safely and accurately placed on a property?



Surveying Word Search

Are you ready to put your surveying vocabulary to the test? This word search is packed with terms that land surveyors know and love—tools, techniques, and key elements of the trade. It's a perfect blend of fun and knowledge. Surveyors play a huge role in mapping, measuring, and shaping the landscapes around us, and this puzzle introduces some of the tools and terms they use daily. If you're curious about how surveyors help build roads, cities, and even map mountains, this word search is for you!

How to Play:

1. **Find the Words:** Look for each surveying-related word listed below. Words can be hidden **horizontally, vertically, or diagonally**, so keep those eyes sharp!
2. **Write it down:** Once you spot a word, write it down in the table below. There are 25 in total.
3. **Learn the word:** Once you find a word and write it down, learn what it means by searching for the definition.

Ready? Grab a pencil and start searching—let's see how fast you can find these essential surveying words!

S	U	R	V	E	Y	I	N	G	X	R	P	T
L	Z	M	P	O	T	O	T	A	L	S	T	A
I	R	O	D	A	T	U	M	K	F	I	V	I
D	R	E	R	I	B	M	A	T	G	P	S	U
A	Z	E	C	O	M	L	I	D	A	R	H	O
R	P	T	N	N	A	T	S	E	S	A	B	P
Y	E	O	M	U	A	T	R	I	A	E	R	R
D	P	Y	I	D	I	Z	B	P	U	L	N	H
C	T	R	I	A	N	G	U	L	A	T	I	O
N	R	E	B	C	H	A	T	M	A	U	T	H
O	O	N	E	N	I	E	R	V	E	A	R	Y
U	G	C	O	N	T	O	U	R	Z	O	N	K
T	G	T	O	P	O	G	R	A	P	H	Y	C
O	B	M	B	O	U	N	D	A	R	Y	I	M
R	B	E	N	C	H	M	A	R	K	E	F	R

Word	Definition
SURVEYING	
EXPERT	

TOTAL STATION	
DATUM	
GPS	
LIDAR	
BENCHMARK	
BOUNDARY	
CONTOUR	
TOPOGRAPHY	
TRIANGULATION	
ALTIMETER	
TRANSIT	
PLUMB BOB	
AZIMUTH	
GEODETIC	
ENGINEERING	
ELEVATION	
COORDINATE	
ORIENTATION	
REFERENCE	
LEVEL	
ANGLE	
MAP	
STATION	
SURVEYING	
EXPERT	
TOTAL STATION	

Exercise 1 - Geographic Information Systems (GIS) Worksheet

Objective: Explore Geographic Information Systems (GIS) and understand how it overlays multiple sets of data. Learn to interpret contour lines and their relationship to natural and built environments, using Spatial Map Viewer and SIX Maps.

Step-by-Step Instructions:

1. Introduction to GIS:

GIS is a system that captures, stores, and analyzes spatial and geographic data. It allows for multiple sets of data to be displayed and analyzed in layers, helping users visualize and understand relationships between features.

Please watch this video:

- [What is GIS? \(4:07\)](#)
- [Craig Roberts - GIS education : Back to the future](#)
- [FASTEST Way to Learn Modern GIS and ACTUALLY Get a Job](#)

2. Exploring Six Maps

- **Step 1: Access the Website.**

Visit <https://maps.six.nsw.gov.au/>

- **Step 2: Search for a Location**

Use the search bar to enter an address, lot number, or suburb in New South Wales to view specific maps and details.

- **Step 3: Exploring Layers**

Open the "Layers" menu to add or remove overlays such as property boundaries, topographic features, and aerial imagery. This allows for a customized view tailored to specific data needs.

- **Step 4: Accessing Property Information**

Click on any property to view details like boundaries, lot numbers, and parcel dimensions. You can often find additional property reports and titles here.

- **Step 5: Measure Distances and Areas**

Use the measurement tools to calculate distances between points or the area of a specific land parcel.

- **Step 6: Zooming and Navigating the Map**

Use the zoom and pan tools to move across different regions or zoom in on specific areas for a closer look.

This tutorial provides foundational steps; students can then explore further depending on their specific needs, such as planning or surveying tasks.

2. SIX Maps Features:

SIX Maps is a GIS platform that displays multiple layers of spatial information. These can include:

- **Property boundaries**
- **Aerial imagery**
- **Land use and zoning information**
- **Topography**
- **Road networks**
- **Natural features (like rivers, lakes, and forests)**

Question:

List two examples of data layers you can see on SIX Maps, and describe what information they provide:

Layer 1: _____

Layer 2: _____

What types of spatial data layers are available on the SIX Maps platform?

How can you use SIX Maps to identify property boundaries in New South Wales?

What is the purpose of topographic and aerial imagery layers on SIX Maps?

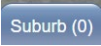
How can a surveyor use SIX Maps for a land planning or surveying project?

What tools does SIX Maps offer to view and measure land parcels?

How does the platform help in understanding NSW's geographical information?

Measurement Activity

Using the  Area Tool work out the approximate areas of the following features by typing them in:

- The suburb you are currently living in, using the  button.

----- m2

- The Suburb of your work placement.

----- m2

- Type in ANZ Stadium using the  button

-----m2

- Think of three famous buildings in NSW. Measure there areas as above

-----m2

-----m2

-----m2

Using the Spatial Map Viewer to Explore Local Areas:

Open the **Spatial Map Viewer** - [NSW Planning Portal Spatial Viewer](#) and explore a local area (e.g., your neighborhood, school, or a natural feature).

Select and observe **contour lines**, which represent the elevation of land at regular intervals.

Understanding Contour Lines:

Contour Lines are lines on a map that connect points of equal elevation. These lines help to visualize the shape of the land, including hills, valleys, and flat areas.

Close contour lines indicate a steep slope, while widely spaced lines suggest a gentle slope.

Question:

What do contour lines represent, and why are they important in understanding topography?

Answer: _____

Exercise 2 Activity: Understanding and Protecting Survey Marks

Objective: *Students will learn the importance of survey marks in land management, their types, and the legal and practical steps needed to protect them. This will build awareness of survey marks' role in property integrity, infrastructure, and community projects.*

[Protecting survey marks - Information Sheet.pdf](#)

Definitions:

- **Survey Marks:** Physical markers used to define land boundaries and support infrastructure projects, such as roads and buildings.
- **Cadastral Marks:** Survey marks that indicate property boundaries, crucial for land ownership and legal property divisions.
- **Permanent Survey Marks:** Markers placed to aid long-term surveying, construction, and mapping needs.

Instructions:

1. **Explore Survey Mark Types:** Using the information sheet, identify at least three types of survey marks and explain their significance in a short paragraph.
2. **Protection Procedures:** List steps required to ensure survey marks are undisturbed before and during construction.
3. **Case Study Analysis:** Imagine a scenario where a survey mark is threatened by a new construction project. Describe actions to protect the mark, following the document's guidelines.
4. **Reflect on Legal Implications:** Research and write a short reflection on the consequences of disturbing survey marks, considering the penalties mentioned in the document.

Outcome:

By the end of this activity, students will understand survey marks' roles in land surveying and development, the procedures for their preservation, and the legal responsibilities associated with them.

Here are some multiple-choice questions based on the provided information:

1. Which of the following is a common type of survey mark?

- Boundary Stone
- Property Peg
- Permanent Survey Mark
- Direction Pole

2. Why is it important to protect survey marks during development?

- They beautify the landscape
- They provide critical reference points for property boundaries
- They can be removed easily
- They improve GPS accuracy

3. What is the penalty for unauthorised disturbance of a survey mark in NSW?

- \$500
- Up to 25 penalty units and possible compensation up to \$10,000
- Warning only
- None

4. How can developers ensure survey marks aren't impacted during road construction?

- Cover marks with concrete
- Remove the marks temporarily
- Use SIX Maps to locate and avoid marks
- Paint over marks

5. Which statement best describes the difference between cadastral and permanent survey marks?

- Cadastral marks are temporary, while permanent marks are long-term
- Cadastral marks define property boundaries; permanent marks serve as long-term reference points
- Both are used exclusively for mapping
- Permanent marks are for roads only

Written Questions:

1. Explore Survey Mark Types:

- What are permanent survey marks, and why are they critical for infrastructure projects?

-
- How do cadastral (boundary) marks contribute to land ownership clarity?

-
- Why are alignment marks essential in construction, especially for road projects?

2. Protection Procedures:

- What steps should be taken before starting a construction project to ensure survey marks aren't disturbed?

-
- How can SIX Maps assist in identifying survey marks before construction?

Why is it essential to involve a registered surveyor when handling survey marks?

3. Reflect on Legal Implications:

- What are the legal consequences of disturbing survey marks without authorisation?

-
- Why might the Surveying and Spatial Information Act impose high penalties for interfering with survey marks?