

Landscape Survey

Creating a Land Profile Diagram

How to turn dumpy level measurements into a profile diagram

Taking measurements is just one part of the surveying process. This activity introduces you to plotting dumpy level measurements to create a clear ground profile diagram. By working with real survey data, you will practise turning numerical height readings into a visual representation of the landscape, developing skills used in archaeology, surveying, and construction. This visual representation will help you understand the lay of the land. You then have the opportunity to reflect on what this tells you about the terrain and activity on site.

Self-Guided Activity: Turning Dumpy Level Measurements into a Profile Diagram

Duration: 60 minutes

Location: Indoors or outdoors with completed dumpy level measurements

Learning Aims

By completing this activity independently, you will:

- Understand how dumpy level measurements relate to height differences
- Learn how to transfer recorded data onto paper
- Create a simple profile diagram showing changes in ground level
- Develop skills in accuracy, organisation, and interpretation.

Equipment

- Completed level record sheet (with reduced levels or readings) - [example sheets are available to download here](#).
- Graph paper
- Pencil and ruler
- Eraser
- Calculator (optional)

Activity Steps

1. Start by checking your level record sheet (10 minutes):

- Identify each survey point in the order it was measured.
- Check that reduced levels (heights) have been calculated, or calculate them now.
- Look for patterns: where does the ground rise or fall?

Remember: Your diagram will visually represent these changes in height.

2. Set Up the Graph Paper (10 minutes)

1. Use the horizontal axis (X-axis) to represent distance along the survey line.
2. Use the vertical axis (Y-axis) to represent height.
3. Choose a suitable scale, for example:
1 cm = 1 metre distance
1 cm = 0.2 metres height
4. Label both axes clearly, including the units used.

3. Plot the Measurements (20 minutes)

1. Start with your first survey point.
2. Measure along the X-axis to the correct distance.
3. Measure up the Y-axis to the correct height.
4. Mark the point clearly with a small dot.
5. Repeat this for every recorded point in order.

Take your time—accuracy matters more than speed.



4. Create the Diagram (10 minutes)

- Use a ruler to join the plotted points with a clean line.
- This line creates a **profile diagram** showing how the land rises and falls.
- Compare your diagram to the real landscape:
 - Where are the slopes steep?
 - Where is the ground flatter?

5. Add Labels and Interpretation (10 minutes)

- Add a title (e.g. Ground Profile from Survey Line A–B).
- Label key features such as slopes, hollows, or platforms.
- Write a short note describing what the diagram shows.

Level sheet examples:

Example Sheet 1: Simple Ground Profile (Beginner)

Survey Description:

A straight survey line across gently sloping ground.

Temporary Benchmark (TBM):

Assigned height = 10.000 m

Level Record Sheet

Point	Backsight (BS)	Intermediate Sight (IS)	Foresight (FS)	Height of Instrument (HI)	Reduced Level (RL)
TBM	1.250			11.250	10.000
A		1.430		11.250	9.820
B		1.610		11.250	9.640
C		1.320		11.250	9.930
D			1.500	11.250	9.750

Task for Learners

- Use the **Reduced Levels (RL)** to plot a profile diagram
- X-axis = distance (e.g. 0 m, 5 m, 10 m, 15 m)
- Y-axis = height (metres)

Example Sheet 2: Varied Terrain with Instrument Move (Intermediate)

Survey Description:

Survey across uneven ground with a hollow and a raised area.

TBM Height: 20.000 m

Level Record Sheet

Point	Backsight (BS)	Intermediate Sight (IS)	Foresight (FS)	Height of Instrument (HI)	Reduced Level
TBM	1.100			21.100	20.000
1		1.450		21.100	19.650
2		1.780		21.100	19.320
CP1			1.900	21.100	19.200
CP1	1.300			20.500	19.200
3		1.100		20.500	19.400
4		0.950		20.500	19.550

Task for Learners

- Plot the profile and identify:
 - The **lowest point**
 - Where the ground begins to rise
- Mark the **change point (CP1)** on the diagram

Example Sheet 3: Archaeological Feature Profile (Advanced)

Survey Description:

Profile across a low earth bank and ditch.

TBM Height: 15.000 m

Level Record Sheet

Point	Backsight (BS)	Intermediate Sight (IS)	Foresight (FS)	Height of Instrument (HI)	Reduced Level
TBM	0.980			15.980	15.000
A		1.100		15.980	14.880
Bank Crest		0.750		15.980	15.230
Ditch Base		1.650		15.980	14.330
B			1.200	15.980	14.780

Task for Learners

- Plot the profile clearly
- Label:
 - **Bank**
 - **Ditch**
- Write one sentence explaining how the diagram shows human modification of the landscape

What You've Achieved

You have:

- Translated numerical survey data into a visual diagram
- Practised technical drawing and data interpretation
- Developed skills used in archaeology, surveying, construction, and engineering