TUNNELWORKS
AS MATHS
STUDENT SHEET

Thames Tide Tables

Key facts you'll need.
- Assume the time interval between successive high or low tides is 12 hours
- Your graph must show the total water depth at any time. This is the sum of the charted water depth (CWD) + the additional depth due to tides at times of spring tides (when the tidal range is at its greatest)
- Two mean tidal depths show the lower and upper range, the mean low water at spring tides (MLWS) and mean high water at spring tides (MHWS)
- At Tower Bridge CWD=2.0m, MLWS = 0.4m and MHWS = 6.9m
- Use the x-axis to represent time and the y-axis to represent total water depth

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Task 1: Create a tidal chart for Tower Bridge

How will you represent time on the x-axis? Assume the first high tide occurs at exactly 6am and the value of x at this point is 0.

Write a basic trigonometric function to represent the tidal graph. Draw the graph for this function using a pencil sketch, graphing calculator or online tool.

Your graph must show the total water depth at Tower Bridge at any time. How can the CWD, MLWS and MHWS help you?

Hints:
- Use the CWD and MLWS to calculate the minimum total water depth. Use a translation to transform your graph to show this.
- Use the MLWS and MHWS values to calculate the range. Use a stretch to transform your graph to show this.

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Task 2: Modify your chart for some Thames Tideway Tunnel construction sites

Assume a time delay of 5 minutes per kilometre.

Location	Distance upriver from London Bridge	CWD	MLWS	MHWS
King Edward Memorial Park Foreshore	-3 km	2.2m	0.5m	7.0m
Blackfriars Bridge Foreshore	8km	2.0m	0.4m	6.9m
Victoria Embankment Foreshore	9km	1.9m	0.2m	6.4m
Albert Embankment Foreshore	11km	1.8m	0.1m	6.2m
Heathwall Pumping Station	12km	1.7m	0.1m	6.1m
Chelsea Embankment Foreshore	13km	1.6m	0.1m	6.1m
Putney Embankment Foreshore	19km	1.5m	0.1m	6.0m

CWD=*charted water depth*, *MLWS*=*mean low water springs*, *MHWS*=*mean high water springs*

Extension ideas

1. How would you transform your chart for British Summer Time?
2. The time between high tides is not exactly 12 hours but can vary between 25 – 50 mins longer than this. How would you modify your chart to reflect a more accurate tidal interval?

Tides don't flow in and out equally fast. An incoming (rising) tide may only last 4 hrs while an outgoing (falling) tide may last for 8 hours. How could you split your chart into sections to show this more accurately?