

TUNNELWORKS

KS3 MATHS LESSON 4 WORKSHEET

MODELLING WITH RATIOS AND PERCENTAGES

Rainfall Modelling: Sample Data

This sample data shows how a shower of rain passing over an area of London affects the flow volume of wastewater through four Combined Sewer Overflows (CSOs). This wastewater will be captured by the new connections to the Thames Tideway Tunnel. We need to understand how the discharge volume from each CSO into the Tunnel contributes to the total volume flowing into the Tunnel, and how this changes over time. Can you work on the data to show the contribution by CSO and by hour?

Data

All values are in cubic metres (m³). Each column represents the hour beginning at that time.

	8am	9am	10am	11am	12pm	1pm	2pm	3pm	4pm	Totals	Totals (%)
CSOA	-	500	1000	1500	2000	500	-	-	-		
CSOB	-	-	500	500	1500	1000	500	-	-		
CSOC	-	-	-	1500	3500	3500	1000	-	-		
CSOD	-	-	-	-	2000	2500	1000	500	-		
Totals											
Totals (%)											

Task 1: Calculate the total flows by CSO and by hour.

The table above shows the hourly flow volume through from CSOs into the Tunnel. Add up the total volume through each CSO (rows) and for each hour (columns).

What is the total volume of wastewater flowing into the Tunnel during this rain shower?

Task 2: Convert your totals into percentages.

Use your overall total to convert the totals for each hour (columns) and each CSO (rows) into a percentage of the overall total.

Task 3: Explore your model

1. CSO A is furthest to the West, while CSO D is furthest to the East. Based on the data in the table, does it appear that the rain shower passed from East to West over London, or from West to East?

2. Which CSO saw the largest volume of wastewater flowing into the Tunnel?
During which time interval did this happen?

3. Between which times did $\frac{2}{3}$ of the total volume of wastewater flow into the Tunnel?

4. Which CSO accounted for about 1 in 4 of the total volume?

5. Which two CSO's total flow volumes are in the ratio 3:2?

6. Which two pairs of times have total flow volumes in the ratio of 3:1?

_____ and _____, and _____ and _____

7. What is the percentage increase in the total flow volume during the hour starting at 10am and then at 12pm?

8. What is the ratio between the total flow volume at 2pm and at 3pm?
