

Proposed by L.K. Sherman, the Unit Hydrograph is a tool used to predict runoff.

Definition: A Unit Hydrograph is the direct runoff hydrograph resulting from exactly 1 unit (e.g., 1 cm or 1 inch) of effective rainfall falling uniformly over a drainage basin for a specific duration.

Fundamental Assumptions

1. Time Invariance

The physical characteristics of the drainage basin (shape, slope, soil type) are assumed to be constant.

Example: A 1 cm storm today will produce the same hydrograph as a 1 cm storm next month, provided the duration and location are the same.

2. Linear Response (Proportionality)

If 1 cm of rain produces a peak flow of $10 \text{ m}^3/\text{s}$, then 2 cm of rain (for the same duration) will produce a peak flow of $20 \text{ m}^3/\text{s}$. The ordinates (vertical values) are directly proportional to the total runoff.

Instructions for Recreating Diagrams in Word

1. Infiltration Curve

Insert > Shapes > Curve.

Draw a line that starts high on the Y-axis and curves downward, eventually leveling off into a horizontal line.

Label the Y-axis as "Rate of Infiltration" and the X-axis as "Time."

2. Linear Response Hydrograph

Insert > Shapes > Curve.

Draw a small "mountain" shape and label it "1 cm UH."

Draw a second, taller "mountain" shape directly over the first one. Make sure it is exactly twice as high at every point. Label this "2 cm DRH."

Add a note: Ordinate of DRH = $2 \times$ Ordinate of UH.