

LEARNING CURVE THEORY

The amount of per unit consumption of resources decreases as a manufacturing unit produces more and more lots of a product. The time consumed in the next lot will be less than the time consumed in the first lot. When a graph is prepared for decrease in the per unit consumption of resources, it is called Learning Curve. [decision curve, experience curve, improvement curve, progress curve]

Learning curve is a geometrical progression.

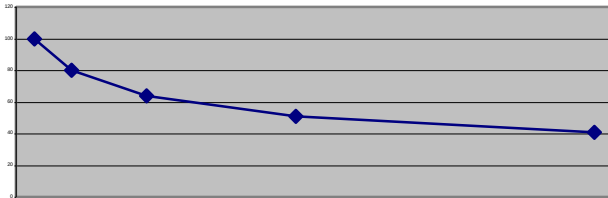
The Learning Curve Ratio: $= \frac{\text{Average Labour Cost of First } 2N \text{ units}}{\text{Average Labour Cost of First } N \text{ units}}$

Where N → number of units produced in one lot.

The learning curve ratio represents the percentage reduction in the average cost per unit for doubling the output. It can be understood from the following table:-

Incremental Quantity	Cumulative Quantity	The Learning Curve Ratio = 80%	Average time per unit (for total unit produced)	Cumulative time taken	Incremental Time
1	1		100	100	
1	2	(100 x 80%)	80	160	60
2	4	(80 x 80%)	64	256	96
4	8	(64 x 80%)	51	408	152
8	16	(51 x 80%)	41	656	248

When the total units produced are doubled at each stage, the average time reduces by 80%. The following is the curve for this illustration.



if the question ask the cost for any quantity in GP, there is no problem. But if the cost is asked for a quantity which is not in GP, the following formula shall be used:

$$Y_x = KX^s \quad [\text{or, } \log Y_x = \log K + s \log X]$$

$Y_x \rightarrow$ Average unit cost, $K \rightarrow$ cumulative average cost of the first unit or lot, $X \rightarrow$ the cumulative number of units or lots produced, $s \rightarrow$ the index of learning which is calculated as below:-

$$S = \frac{\text{Log of learning ratio}}{\text{Log of 2}}$$