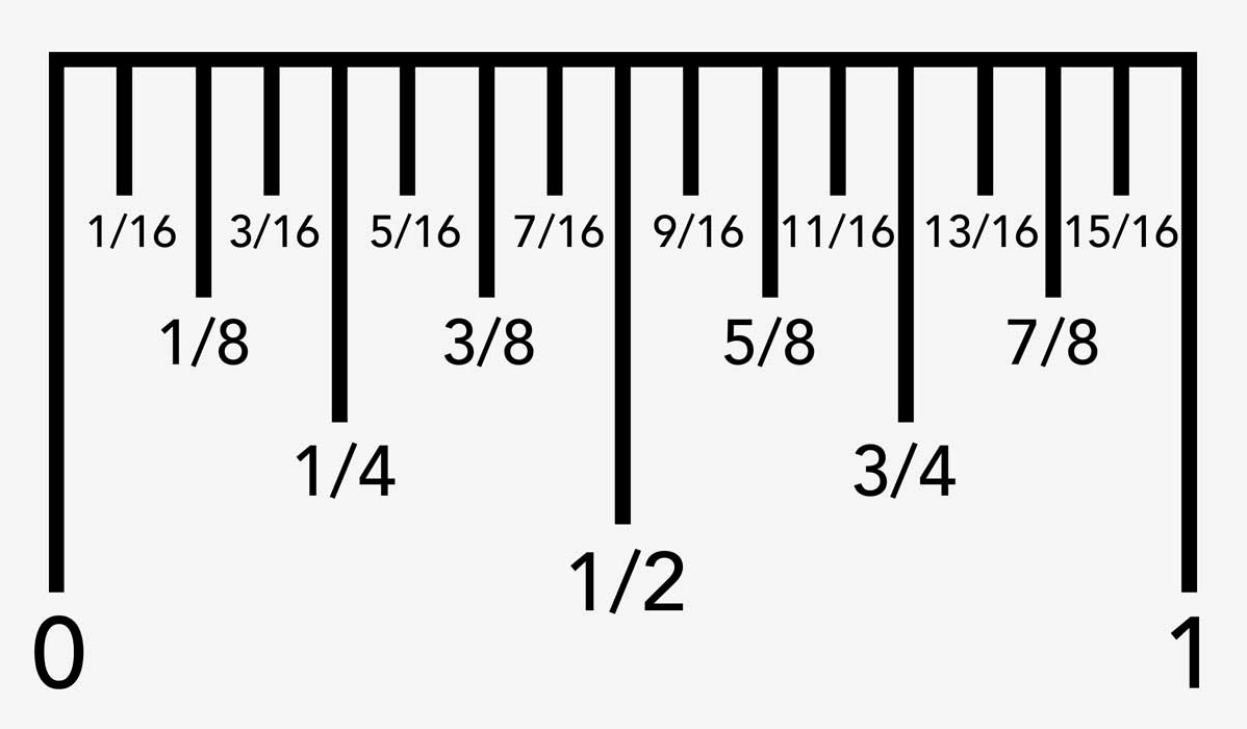
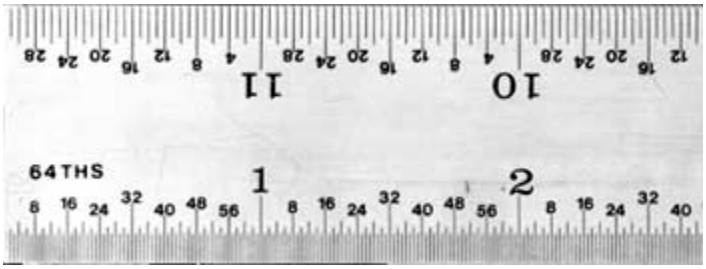
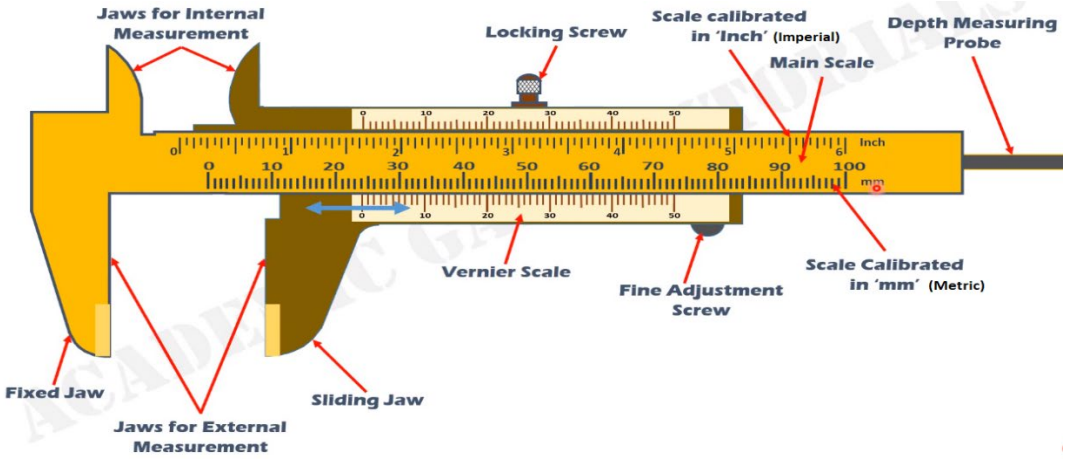
Precision Measuring Tools:

- Precision Ruler:





- Vernier Sliding Caliper:
  Used to measure Height, Diameter, Width of a small object:



- The least count of the Vernier Scale:

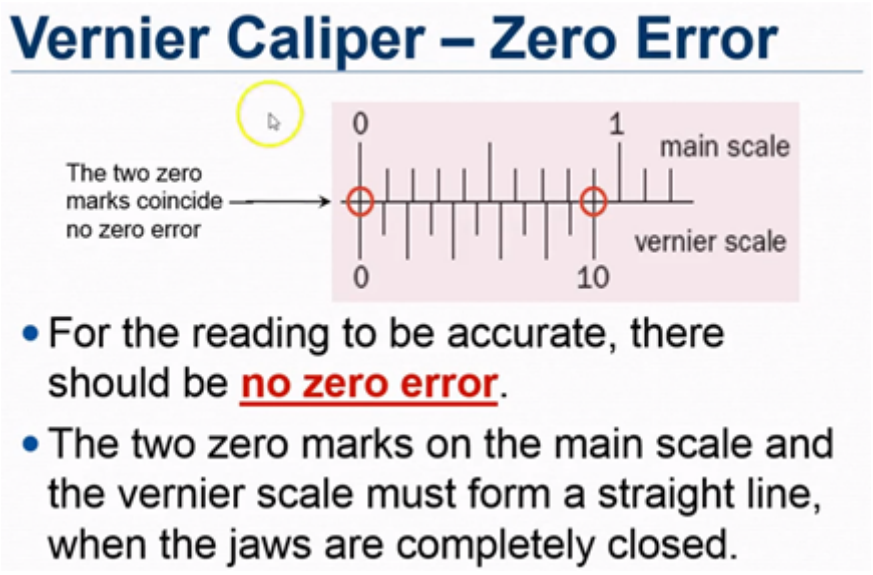
50 Divisions of vernier scale = to 49 divisions of main scale

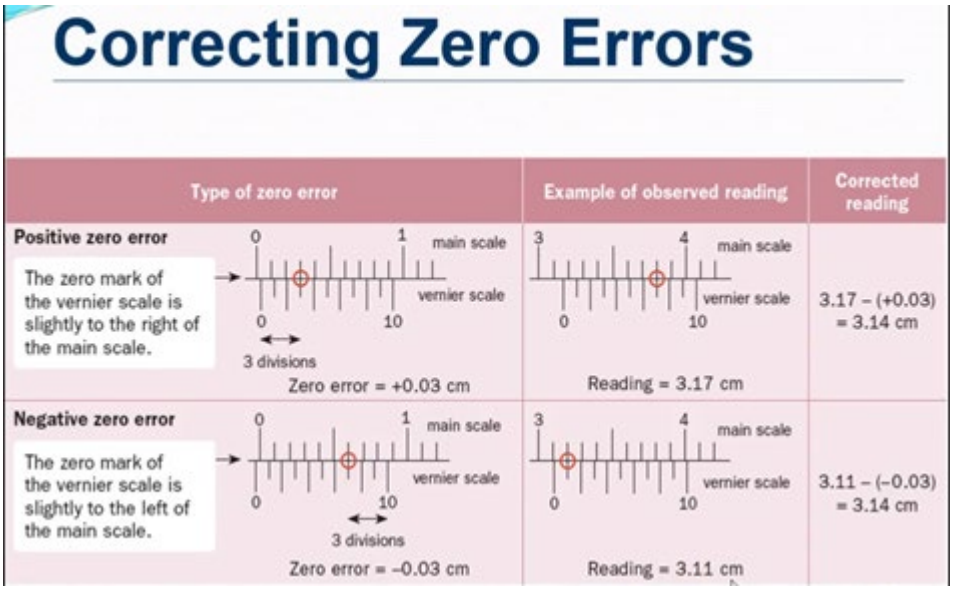
Least Count= 1 main scale division or ratio – 1 vernier scale division or ratio = 1 mm – 49/50mm=1mm – 0.98mm=0.02mm

0.02mm is the least value that can be measured by vernier caliper

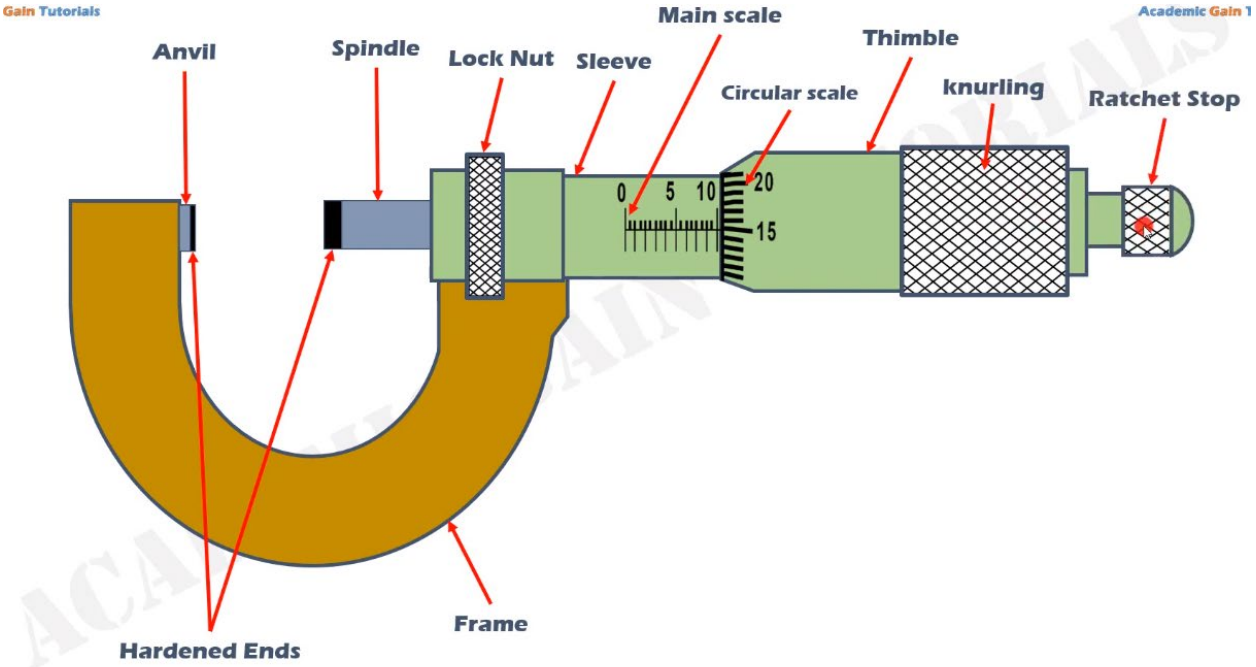
- Dimension to be measured = Main Scale Reading + (Vernier Scale Count x Least Count)

- Zero Errors:

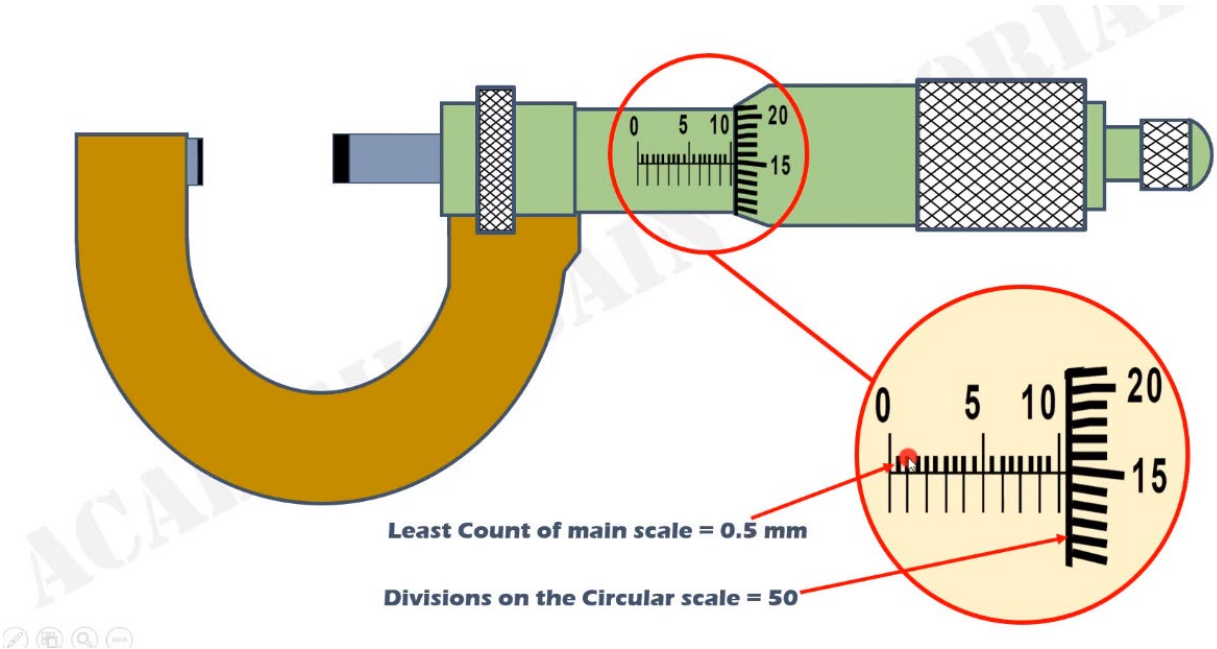




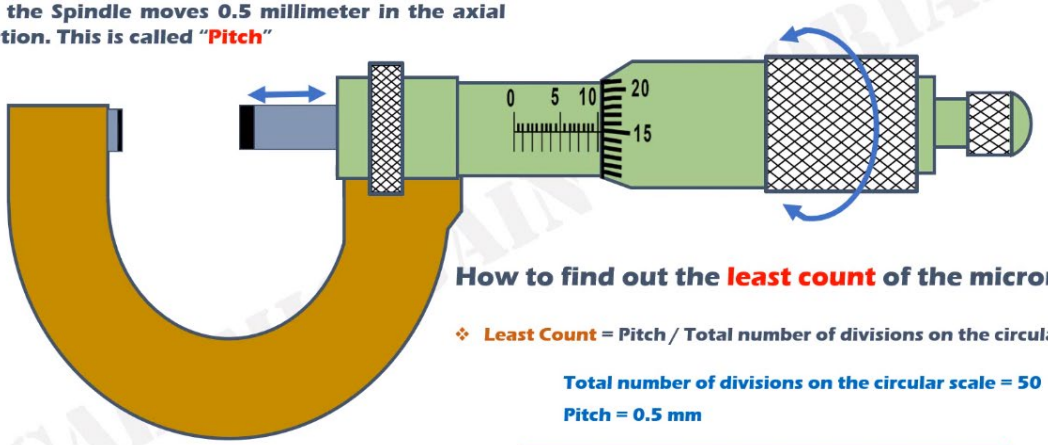
- Micrometer Instrument:



Thimble: used to adjust for hard movement of the spindle.
Ratchet Stop: used to adjust Spindle movement slightly.



➢ When the Thimble completes it's one revolution, then the Spindle moves 0.5 millimeter in the axial direction. This is called "Pitch"



How to find out the least count of the micrometer?

❖ **Least Count** = Pitch / Total number of divisions on the circular scale

Total number of divisions on the circular scale = 50

Pitch = 0.5 mm

Thus, Least Count = 0.5 mm / 50 = 0.01 mm

❖ **Dimension to be measured = Main Scale Reading + (Circular Scale Reading X Least Count)**

Vernier caliper vs Micrometer:

Caliper can measure up to 0.02 mm if it's super accurate in normal conditions it can measure up to 0.1 mm or 100 um range while micrometer can measure up to 0.01 mm or 10 um range if the tool is accurate

Caliper can take interior measure while micrometer can't