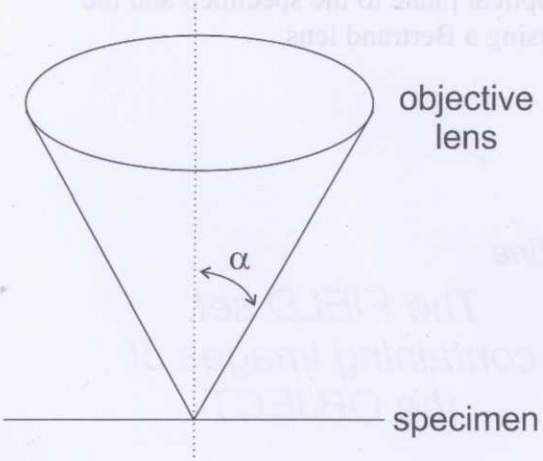
## (1) Resolution – swinging apertometer

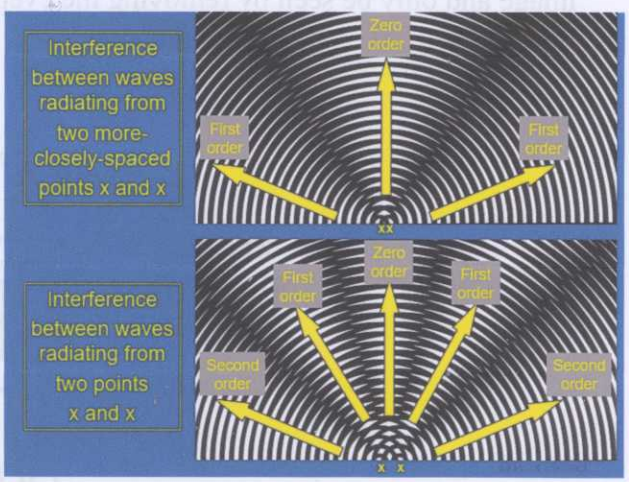
Numerical aperture – measure of the ability of the lens to capture diffracted / scattered light.

Numerical aperture, NA = nsinα


n = refractive index of the medium between the object (specimen) and the objective lens

$n_{air} = 1.0003 \approx 1$




| Angle 1 | Angle 2 | Collection angle | Half angle, α | Measured NA | Actual* NA | Resolution* (μm) | Depth of field* (μm) |
|---|---|---|---|---|---|---|---|
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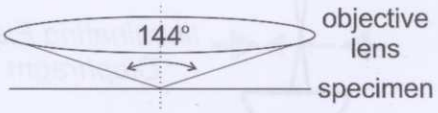
- Calculate the N.A for:




- What if we increase the collection angle to 164°?
- The Abbe formula to calculate lateral resolution is:

  $d = \lambda/2NA$

  The approximate formula to calculate depth of field is:

  $$\text{depth of field} = n\lambda/NA^2$$

- For calculations using white light, assume a wavelength of 500 nm (0.5 μm).