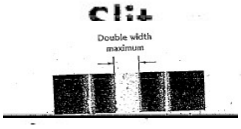
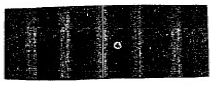
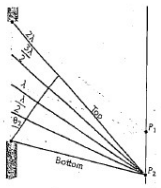
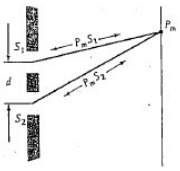
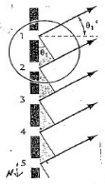
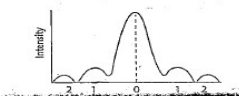
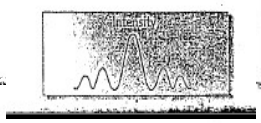
Note Title

Compare & Contrast: Single, Double Slit, Diffraction Grating

Property or Feature	Single Slit	Double Slit	Diffraction Grating	Similarity or Difference?
1. Appearance				Similar – all have antinodal & nodal lines Diff – single slit has double-wide centre diff grating distinct
2.				
diagram of how image is formed 3.				All due to constructive / destructive interference
4.				
5. Intensity graph				Similar – single & double have bright centre & fade quickly Diff grating more or less constant intensity
6.				
7. Equation	$\lambda = \frac{w\Delta x}{L}$	$\lambda = \frac{d\Delta x}{L}$ Also $\lambda = \frac{d x_n}{L(n-\frac{1}{2})}$, $\lambda = \frac{d x_m}{L m}$	$\lambda = \frac{d\Delta x}{L}$, $d = \frac{w}{N}$	Diff → single slit uses slit width, double & diff grat use slit separation
8. Defining feature of appearance	double central maximum		sharpest pattern	
9.				
10. Why the image is formed	diffraction effect ←		→ interference effect	See diagram above
11. line spacing	Δx is not constant for whole pattern		Δx is widest	Δx is constant for double slit & diff grating and for line not next to central max in single slit
12.				
13. Intensity description	← pattern fades as n increases		pattern is more or less constant as n increases	true for single & double slit, less so for diff. grat.
Effect	←	separates white light into colours	→	This is true for all, but especially for the diff grat since Δx is widest
Huygens's principle	opening is considered multiple sources			