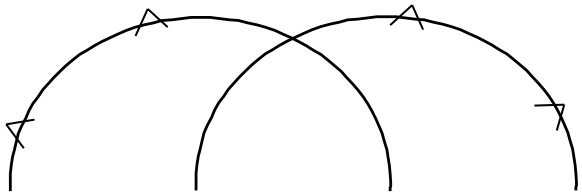
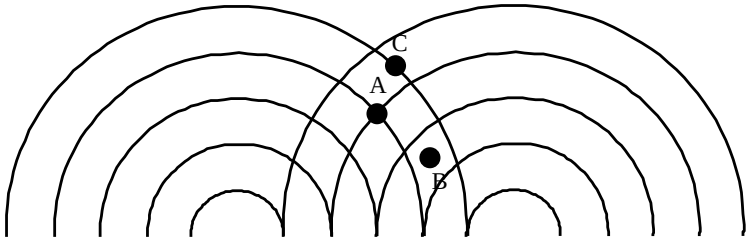
Name:_____Date:_____Per:_____

Wave Optics: Interference Demo

1. The intersection of two crests is shown. Sketch the position of these two crests a short time later and indicate the direction of the movement of the intersection.



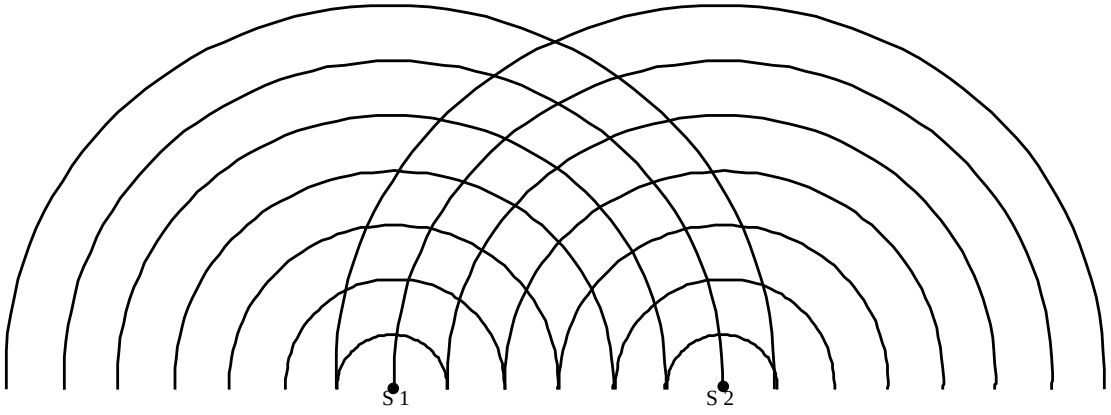
2. The following wave front model represents crests as dark lines. The marks showing the outward propagation are left out for clarity.



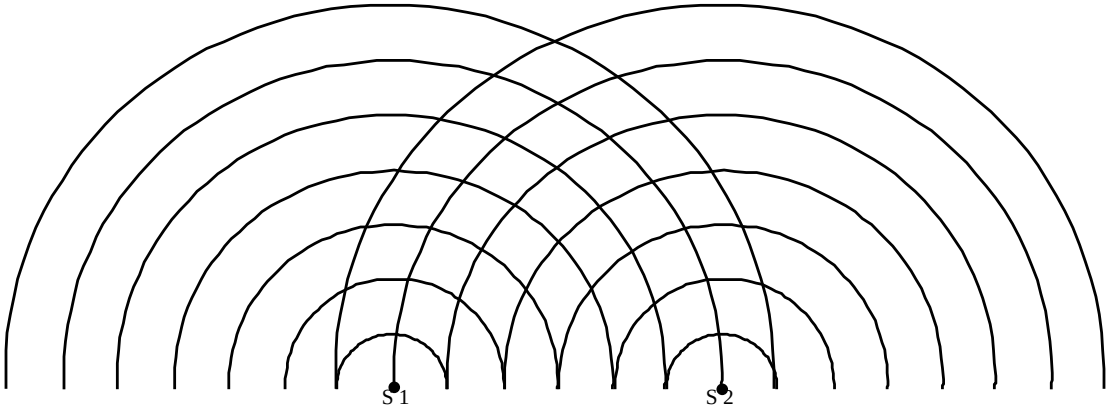
Describe the interference occurring at points A, B, and C.

3. If the double crests define a maximum line and the combination of a crest and a trough define a minimum or node line, what does a double trough define? Show with diagrams.

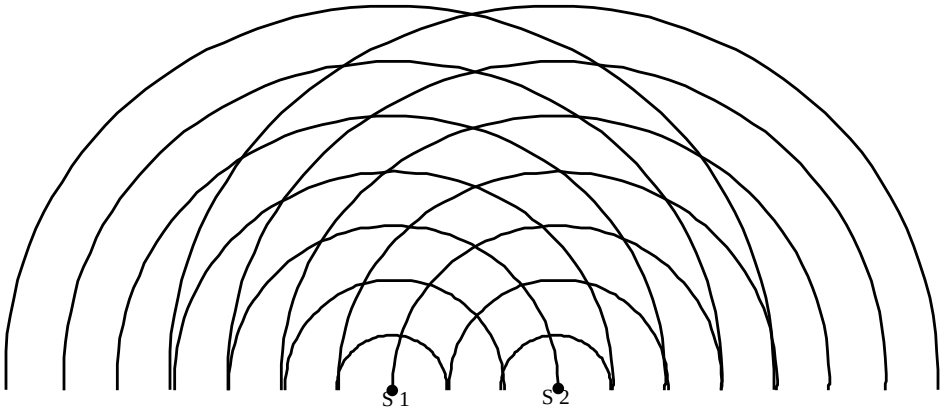
4. On the pattern below draw the maximum lines (antinodal lines). Where the lines come out the top label the zero, first, second and third order lines on each side. (7 lines total)



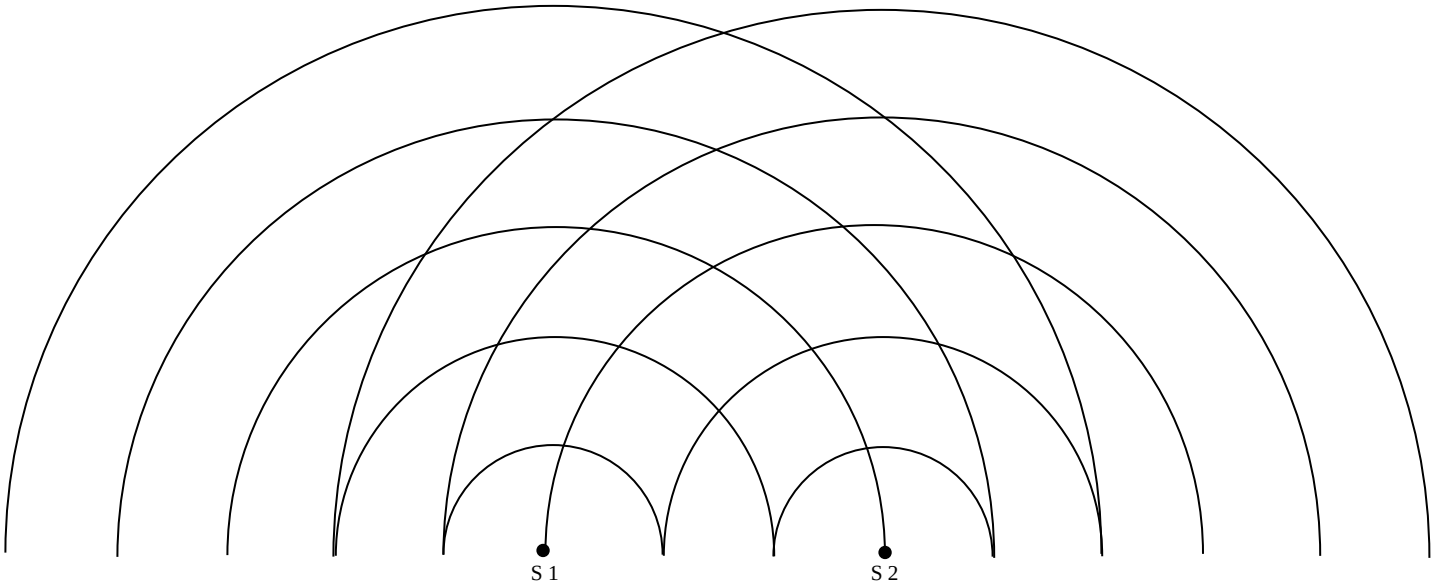
5. On the pattern below draw 6 minimum lines (nodal lines).



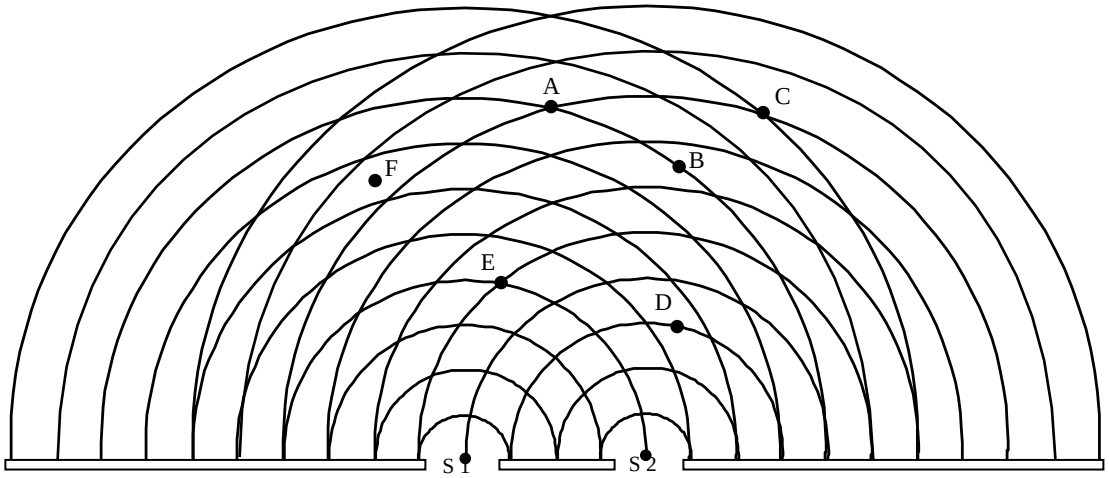
6. In questions 4 and 5 the distance between source 1 and 2 is 6 wavelengths. Now they are separated by 3 wavelengths. Draw in 5 lines of constructive interference and comment on what happens to the spacing of the lines of interference.



7. In this question the sources are the same distance apart as in number 4, however the wavelength is doubled. Draw in 5 lines of constructive interference and comment on what happens to the spacing of the lines of interference.



8. a. For each of the lettered points on the interference pattern below answer these questions: How many wavelengths from each source is it, by how many wavelengths do the two paths differ and whether there is constructive or destructive interference at the point.



Letter	Wavelengths from S1	Wavelengths from S2	Difference	Constr or Destr
A				
B				
C				
D				
E				
F				

b. Explain in a sentence how the path difference between a point and the waves sources determines the type of interference.

9. Answer the following questions using the interference pattern below.

a) What is the difference in the two pathlengths to A in wavelengths? (show setup.)

b) What is the difference in the two pathlengths to B in wavelengths? (show setup.)

c) What is the difference in the two pathlengths to C in wavelengths? (show setup.)

d) Draw in the zero order line. On the right side of the pattern draw in all of the nodal lines, and on the left side all of the antinodal lines.

e) Find a point on a second nodal line past the center where a crest from S1 and a trough from S2 interfere. Label the point **X**.

f) Find a point on a third order antinodal line where a trough from S1 and a trough from S2 interfere. Label the point **Y**.

g) Locate the point 5.0 cm from S1 and and 6.5 cm from S2. Label the point **Z**.

h) Which of the six letters on the diagram show constructive interference?

i) Which of the six letters on the diagram show destructive interference?