

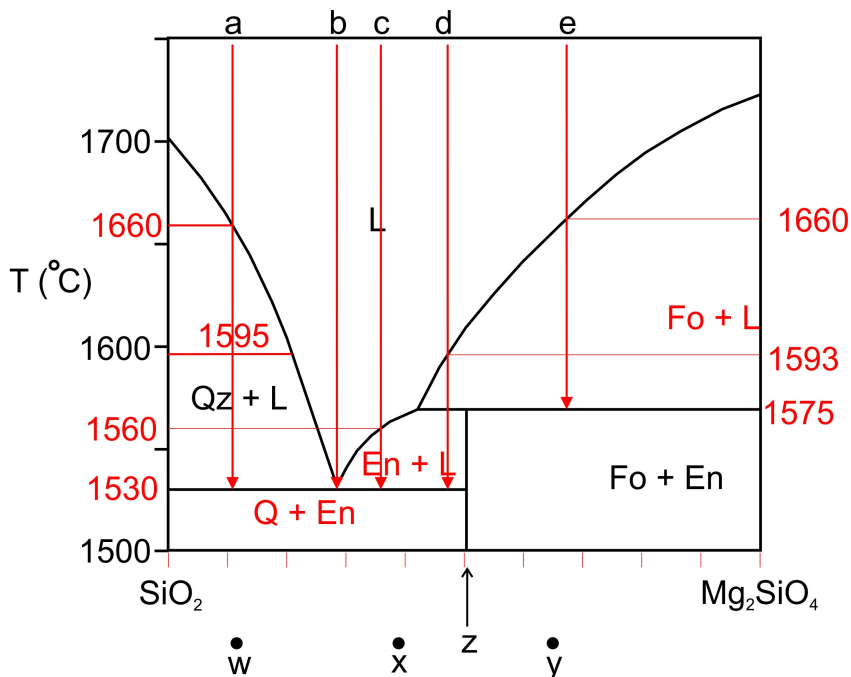
The system SiO_2 - Mg_2SiO_4 ANSWERS

1. Label the fields that are unlabeled. **SEE DIAGRAM**

2. What composition and what mineral plot where the arrow (z) is shown? **$\text{Mg}_2\text{Si}_2\text{O}_6$ = ENSTATITE**

3. Consider melts of compositions a, b, c, d, and e. Fill in the following table to answer these questions:

- If the melt cools, at what temperature will it begin to crystallize?
- At what temperature, will it be half crystallized? (This is tricky for B, C, D, and E. Think.)
- At what temperature will it be completely crystallized?
- After it is done cooling, what minerals will be present and how much (%) or each?



melt	Liquidus T	50% T	Solidus T
A	1660	1595	FOR ALL OF THESE, IT MUST OCCUR AT THE EUTECTIC TEMPERATURE = 1530
B	1530	FOR ALL OF THESE, IT MUST OCCUR AT THE EUTECTIC TEMPERATURE = 1530	
C	1560		
D	1593		
E	1660	PERITECTIC = 1575	PERITECTIC = 1575

4. Consider rocks with compositions shown at w, x, and y. Fill in the following table to answer these questions:

- Which minerals will be present in those rocks at low temperature?
- If heated, when will they begin to melt?
- What will be the composition of the first drop of melt?
- At what temperature will they be completely melted?
- What will be the composition of the final melt? (Give wt% SiO_2 and wt% Mg_2SiO_4)

rock	minerals	solidus T	first melt comp	liquidus T	final melt comp
w	Q + En	1530	Eut. = 28% Mg_2SiO_4 - 72% SiO_2	1660	12% Mg_2SiO_4 - 88% SiO_2
x	Q + En	1530	Eut. = 28% Mg_2SiO_4 - 72% SiO_2	1565	38% Mg_2SiO_4 - 62% SiO_2
y	En + Fo	1575	Per. = 44% Mg_2SiO_4 - 56% SiO_2	1650	65% Mg_2SiO_4 - 35% SiO_2