IN CLASS EXERCISE: METAMORPHIC FACIES

Use the P-T diagram above to answer the following questions. The depth scale is in km.

1) According to the above plot, what mineral will neocrystallize at 30km depth and 500°C?

Kyanite

2) Given this geothermal gradient, which mineral will never form?

Kyanite

3) If a body of wet granite is at 30km depth and 750°C, what mineral will neocrystallize?

No minerals will neocrystallize because the wet granite will partially melt.
4) The dashed lines above are geothermal gradients in various regions of the Earth. Which curve represents a subduction zone? Why?

#5, because the sinking plate in a subduction zone was cold when it was at the sea floor and it heats up very slowly with depth. So, at a given depth in the earth, a subduction zone will be colder than any other region. Curve #5 is the coldest at all depths, so it must represent a subduction zone.

5) The various metamorphic facies are plotted above. If you were looking at a hand sample, how would you distinguish between the various metamorphic facies? (Hint: obviously you can’t tell pressure and temp in a hand sample, so think of some other way to identify a metamorphic facies)

Metamorphic facies are different groups of minerals that are diagnostic of a given pressure and temperature range. Therefore, in a hand sample, one could distinguish between the different facies based on what minerals are present.