Name: _____
ID:_____ Volcanoes – Worksheet 1

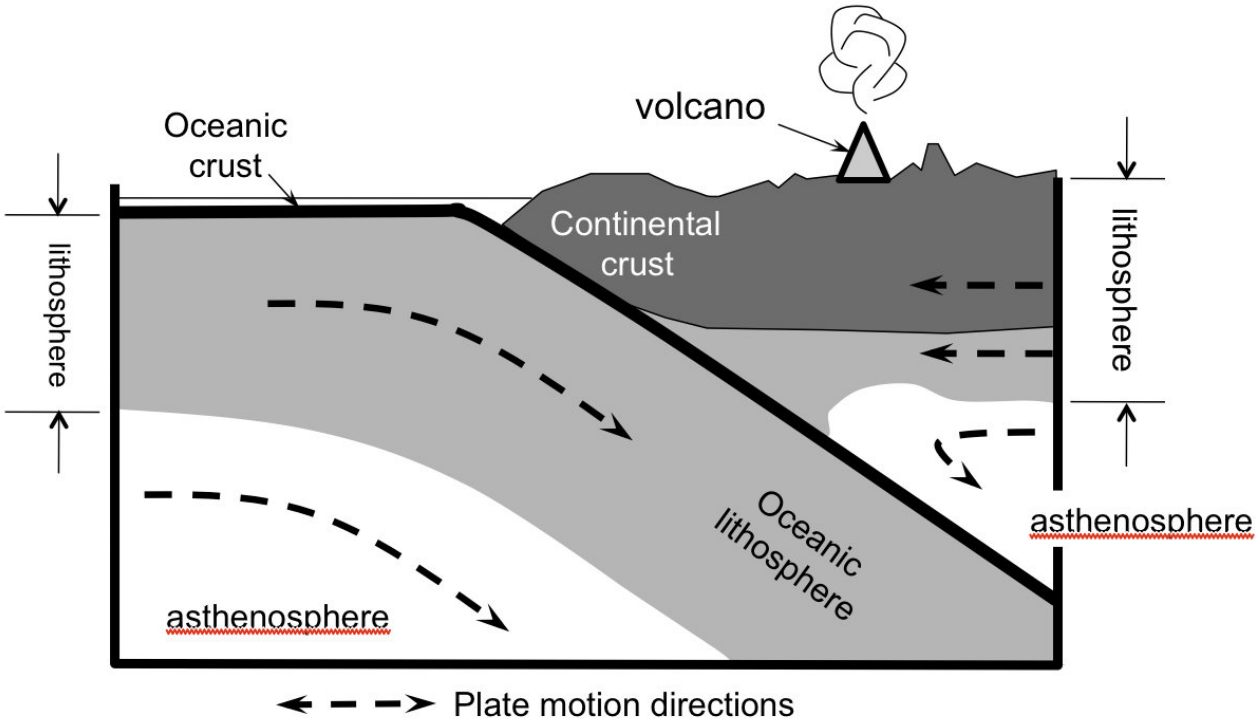
Analysis of Volcanism at a Continental Subduction Zone

Different plate tectonic settings and hot spot locations produce very specific types of volcanism. Using your knowledge of:

- plate tectonics,
- general rock types (ultramafic, mafic, intermediate, felsic),
- the 4 key properties of magma (SiO_2 content, viscosity, temperature, and gas content)

you can deduce a great deal about the style of volcanism and the hazards at any location. You could answer the following questions for any volcanic location… in this case, we will look at a continental subduction zone.

The following cartoon is a simple sketch of a continental subduction zone. The location of the volcanic arc is noted on the surface. Feel free to annotate the sketch with your answers.



1a) Where does the initial melting occur in the subduction zone? (mark with a X)

1b) Why there?

1c) What is your best guess of the properties of the magma at that point?
[rock composition, SiO_2 content, viscosity, temperature, and gas content?]

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The buoyant magma then rises to the surface, creating fractures and following existing weaknesses/fractures/faults.

2a) Does the magma that reaches the surface have the same composition as the initial melt you noted in (1)? Why?

2b) If not, what is the 'secondary source' of magma? Where does that melting occur? (mark with a Z)

2c) What is your best guess of the properties of the magma at that point?
(rock composition, SiO_2 content, viscosity, temperature, and gas content?)

2d) What types of rocks would you think the volcano would be constructed from?
[mafic (basalt), intermediate (andesite), felsic (rhyolite)]

3) We haven't talked in detail about volcanic hazards yet. However, based on your predictions about magma composition, would you expect volcanism at this location be an explosive eruption or an effusive lava flow?