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**About the concept puzzles:**

I've included keys for all of the puzzles as a separate layer in Illustrator (and included in this pdf file). These keys are meant to be schematic. If there are mistakes, please let me know and I'll try to fix them.

NAME \_\_\_\_\_

Name the type of faults shown in each of these focal mechanism plots (in words) and draw the two possible faults onto the maps (with correct map symbols). One example has been completed for you.

Fault type	Possible Map 1	Possible Map 2
conjugate strike-slip		

Rate your confidence in your answers: not at all  $\longrightarrow$  very sure  
1 2 3 4 5

NAME \_\_\_\_\_

Name the type of faults shown in each of these focal mechanism plots (in words) and draw the two possible faults onto the maps (with correct map symbols). One example has been completed for you.

Fault type	Possible Map 1	Possible Map 2
conjugate strike-slip		
oblique normal		
reverse		
conjugate strike-slip		
normal		
oblique reverse		

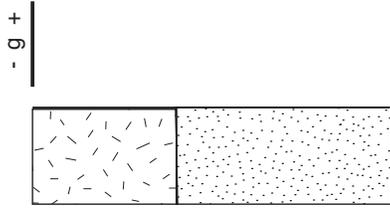
Rate your confidence in your answers: not at all  $\longrightarrow$  very sure  
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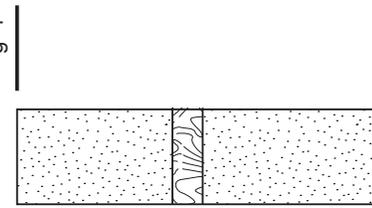
Draw the approximate gravity profiles that you might measure above these geologic faults and shear zones.

-  granite
-  shear zone
-  sandstone

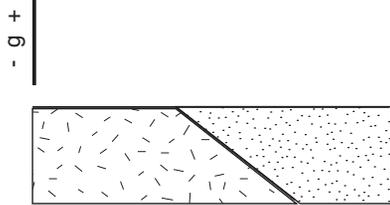
relative densities:  
granite > shear zone > sandstone



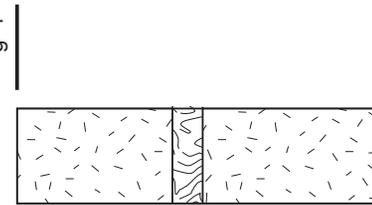
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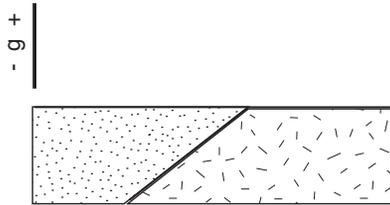
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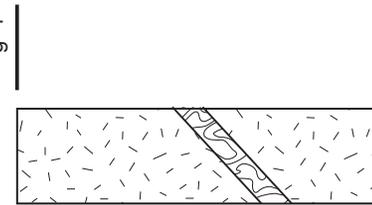
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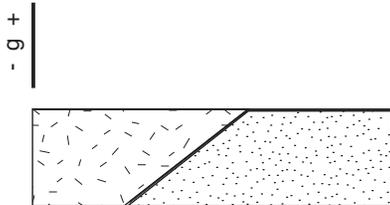
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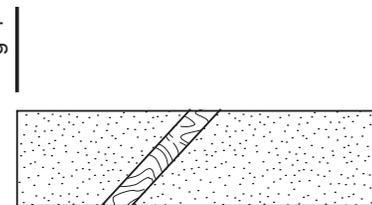
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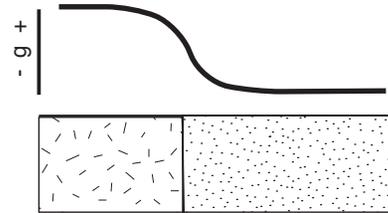
Rate your confidence in your answers: 
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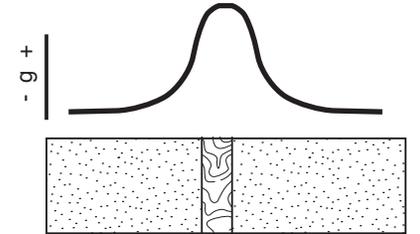
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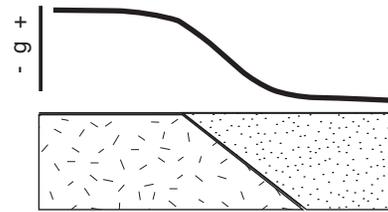
relative densities:  
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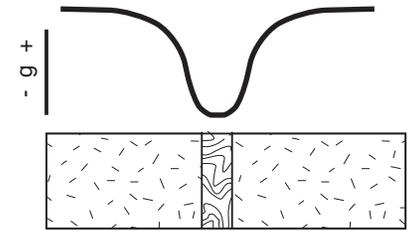
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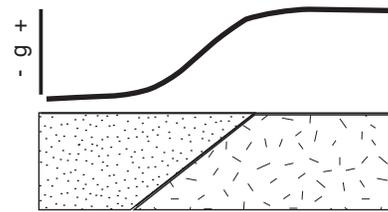
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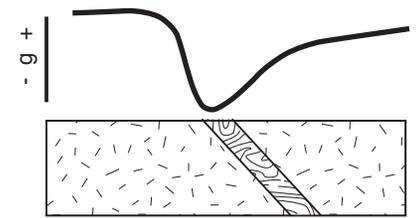
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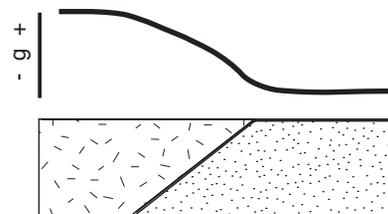
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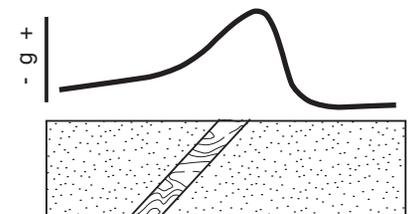
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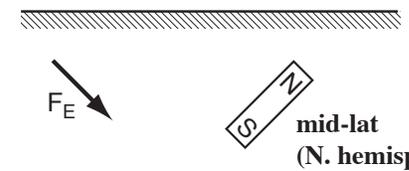
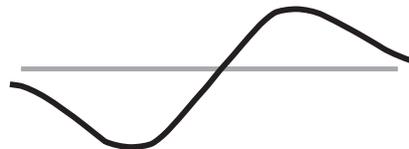
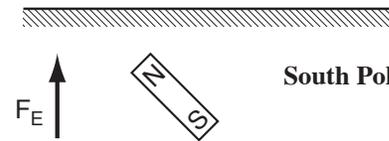
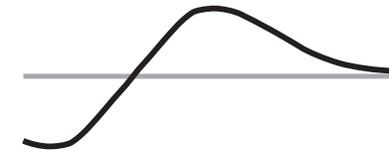
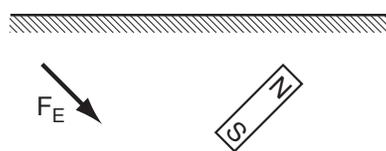
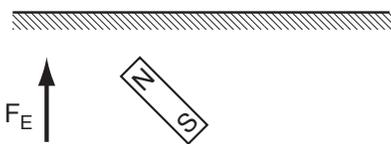
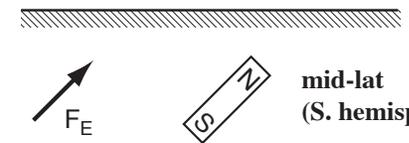
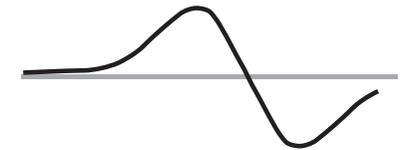
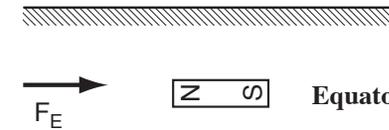
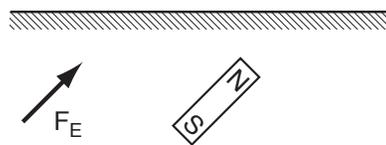
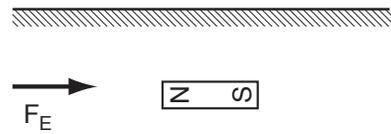
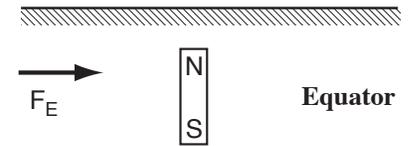
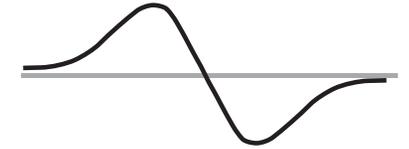
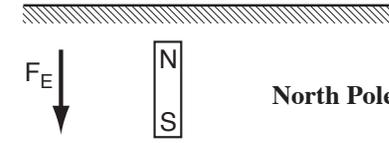
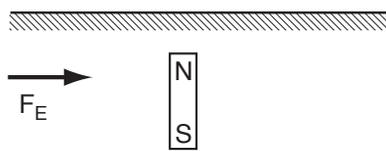
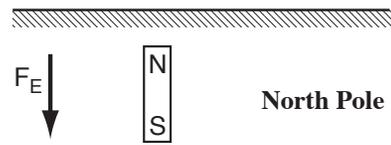


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Rate your confidence in your answers: 
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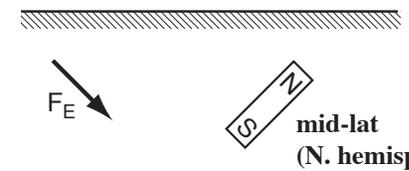
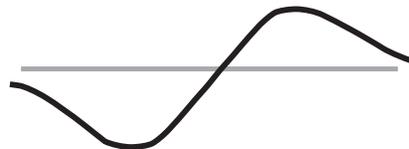
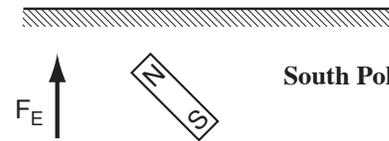
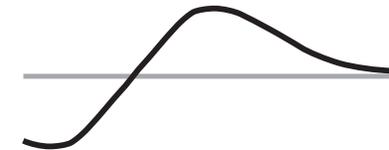
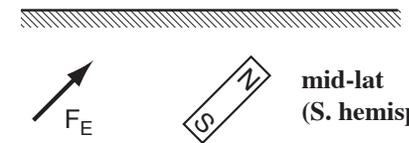
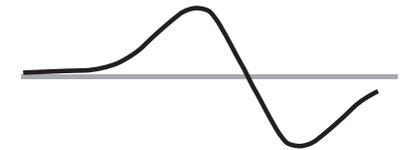
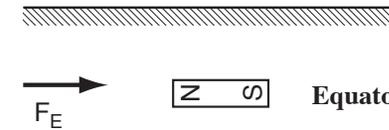
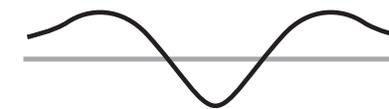
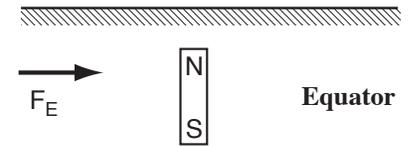
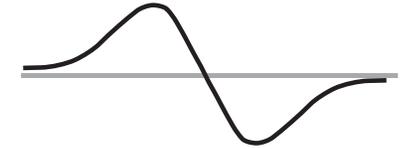
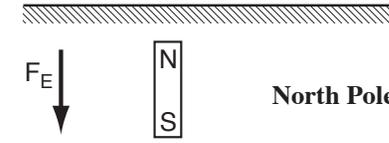
For each of the following cartoons, sketch the approximate magnetic profile that you would expect over the buried dipole given the orientation of the magnetic field at each point. The gray line represents the ambient magnetic field (without the buried dipole). Also indicate the approximate latitude for each cartoon. An example is provided.



Rate your confidence in your answers: not at all 1 2 3 4 5 very sure

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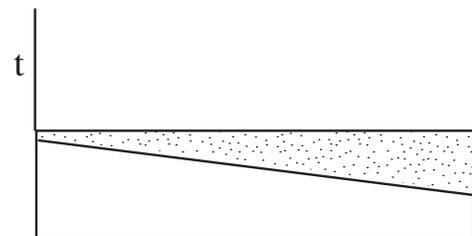
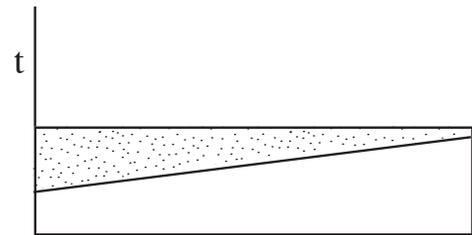
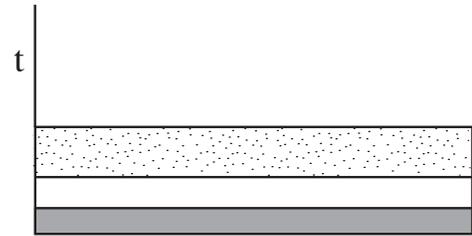
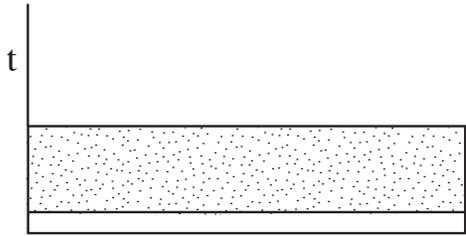
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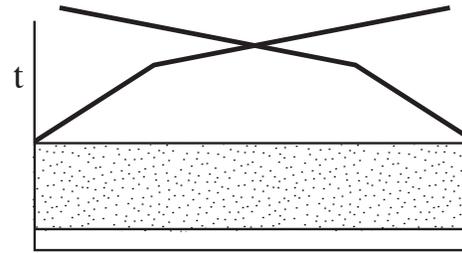
Draw the forward and reverse travel-time curves in a seismic refraction experiment for the bedrock geometries below. Assume velocity increases with depth. Describe major features of each travel-time curve in words in the intercept to the cartoon.



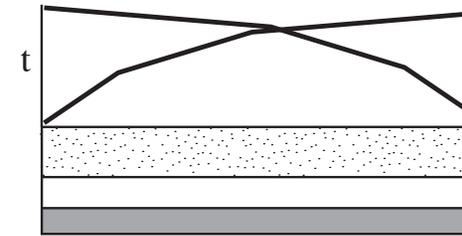
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NAME \_\_\_\_\_

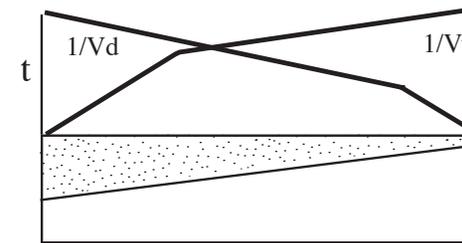
Draw the forward and reverse travel-time curves in a seismic refraction experiment for the bedrock geometries below. Assume velocity increases with depth. Describe major features of each travel-time curve in words in the space adjacent to the cartoon.



slopes here are  $1/v_1$  and  $1/v_2$ ; symmetric curves



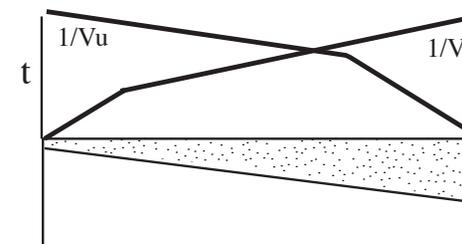
slopes here are  $1/v_1$ ,  $1/v_2$ , and  $1/v_3$  - note the time is shorter for  $v_1$  in this example because layer 1 is thinner; symmetric curves



for both dipping layer problems:  
(a) the two slopes from layer one are both  $1/v_1$ ;

(b) the total travel time for both curves is the same - this is the reciprocal time;

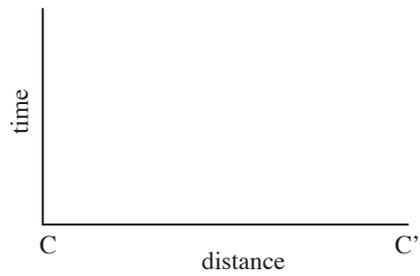
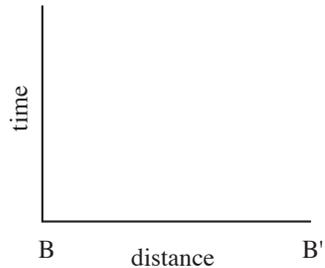
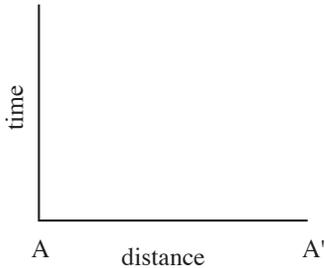
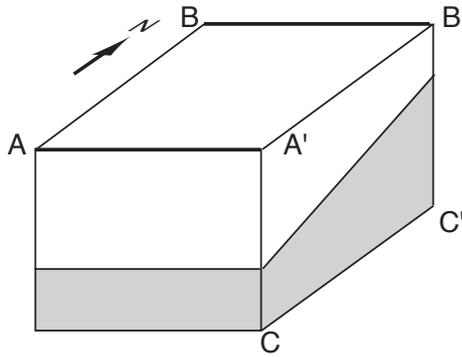
(c) the travel-time curves are asymmetric because the slopes for layer two are different - one is the reciprocal of up-dip velocity while the other is for down-dip velocity; the true velocity for layer two is ~the average of up and down dip velocities



Rate your confidence in your answers: not at all 1 2 3 4 5 very sure

NAME \_\_\_\_\_

The block diagram on the right shows a dipping layer. Draw the forward and reverse travel-time curves for seismic refraction profiles across A-A', B-B', and C-C'



Questions:

(1) Compare/contrast the travel-time curves for these three profiles.

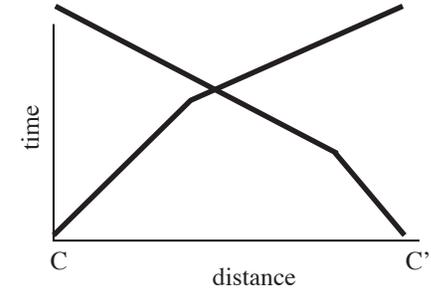
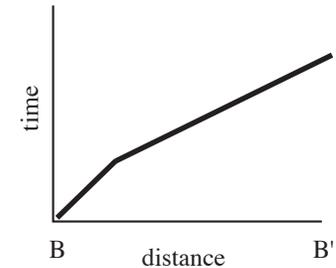
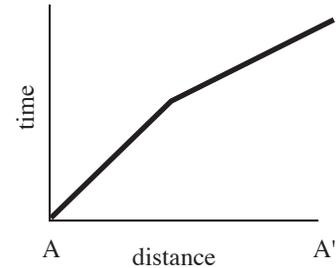
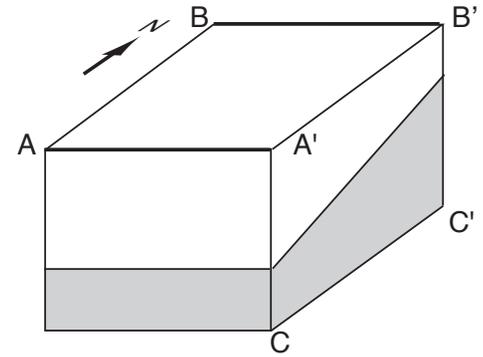
(2) If you only had enough money to collect data from one seismic refraction profile, which profile would you chose and why?

(3) Describe the orientation of your chosen profile relative to that of the overall geometry of the geologic structure?

Rate your confidence in your answers: not at all 1 2 3 4 5 very sure

NAME \_\_\_\_\_

The block diagram on the right shows a dipping layer. Draw the forward and reverse travel-time curves for seismic refraction profiles across A-A', B-B', and C-C'



Questions:

(1) Compare/contrast the travel-time curves for these three profiles.

A-A' and B-B' are very similar but layer 1 in B profile is thinner indicated by shorter cross-over distance. Because C-C' has a dipping interface, get more complicated forward/reverse travel time curves showing C' is updip.

(2) If you only had enough money to collect data from one seismic refraction profile, which profile would you chose and why?

C-C' because it captures dip of layer

(3) Describe the orientation of your chosen profile relative to that of the overall geometry of the geologic structure?

The profile is perpendicular to the strike of the dipping layer

Rate your confidence in your answers: not at all 1 2 3 4 5 very sure