

Video 5A: Stuff you need to know before we look at Compression Event

Let's review some basics to make sure we don't leave anyone in the dust!

1) Friction causes heat.

Remember, HEAT IS MOLECULAR MOTION. More movement, temp goes up. Less movement, temp goes down.

INSTANT LAB: Rub your hands together to move the molecules in your skin and make heat.

2) Rocks can melt.

Different rocks melt at different temperatures. For example, minerals found in granite:

- 1) Quartz melts at _____. 2) Amphibole and Na-rich feldspars melt at _____. 3) Olivine melts at _____.
2) A machine you can use to measure melting rocks at very temps is called _____.

3) Friction of sliding rocks can cause enough heat to make them melt.

We have equations that relate friction to heat in various materials. If we had a stack of bricks _____ high, and moved it _____, the bottom brick would melt! If the stack was _____ high, the brick would melt if it moved only _____.

4) Friction over a large surface area is very powerful!

INSTANT LAB: Use two notebooks (or books that are similar size). Alternate pages of the books as shown in this diagram. You don't have to do every page, just a lot of them. When you are done, have someone hold the spine of one book and you hold the other. Now try to pull the books apart. If you set it up properly you should be unable to pull them apart. The friction holding them together is the combination of all the sheets surface area. (Can you imagine how much friction there would be if an entire continent was to slide over the rocky mantle beneath it?!)

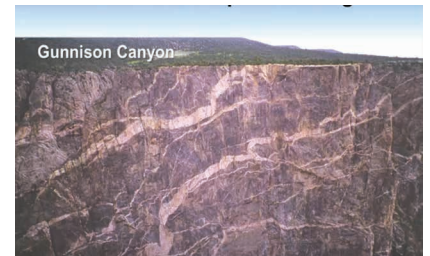


Overlap them more than shown here

5) Melting points can be tweaked by the addition of other substances.

Example 1: _____ can lower the melting point of _____. (See lab in activity section.)

Example 2: _____ can lower the melting point of _____.



6) When magma melts, it becomes compressible.

Pressure can reduce its volume by _____.

(We know this because of experiments done in a diamond anvil machine.)

NOTE: Its mass stays the same, but its volume gets smaller. This means it becomes more _____.

At what depth does magma become more dense than the surrounding rock? _____

What is the practical result? _____ What do we call this level? _____

7) "Nature abhors a vacuum." (a famous phrase from 20th century science books)

INSTANT LAB: Press your palms together very tightly. The pressing will push out most of the air that is between your palms. Now very slowly start to pull your hands apart. Can you feel the pressure increase between your hands the more you pull? Finally, the pressure will become high enough that a tiny crack will open up somewhere and air will come rushing in, breaking the vacuum. What if a crack never opened up? Your hands would eventually deform. Something has to go in and fill the would-be space that is trying to open up.

8) Most rocks can't bend. They break.

I know, "Duh." But when you see folded mountains, be aware that mainstream geology says that given enough time, rocks can bend. There are a few exceptions, like thin sheets of a rare type of sandstone called itacolomite, but even these don't bend very much.

9) When sedimentary rock is heated and compressed, it turns into metamorphic rock.

Sandstone turns into _____. Limestone turns into _____. Shale can turn into _____.

How do traditional geologists explain rock features that show extreme bending and folding? They say it happened slowly over eons of time and the pressure gradually heated the rocks enough to bend them. HOWEVER, if there was that much heat and pressure, the sedimentary layers should change into metamorphic rock.

Reality check: There are usually no metamorphic rocks in these layers!

