atch the numbered parts of this rock cycle diagram with its correct labe

For more than two centuries, geologists have advanced their science by treating the Earth as a recycling machine. One way of presenting that to students is a concept called the rock cycle, usually boiled down into a diagram. There are hundreds of variations on this diagram, many with errors in them and distracting pictures on them. Try this one instead. Rocks are broadly classified into three groups: igneous, sedimentary and metamorphic, and the simplest diagram of the "rock cycle" puts these three groups in a circle with arrows pointing from "igneous" to "sedimentary," from "sedimentary" to "metamorphic," and from "metamorphic" to "igneous" again. There is some sort of truth there: for the most part, igneous rocks break down at the Earth's surface to sediment, which in turn becomes sedimentary rocks. And for the most part, the return path from sedimentary rocks back to igneous rocks goes through metamorphic rocks. But that's too simple. First, the diagram needs more arrows. Igneous rock can be metamorphosed directly into metamorphic rock, and metamorphic rock can turn directly to sediment. Some diagrams simply draw arrows between each pair, both around the circle and across it. Beware of that! Sedimentary rocks cannot melt directly into magma without being metamorphosed along the way. The minor exceptions include shock melting from cosmic impacts , melting by lightning strikes to produce fulgurites, and friction melting to produce pseudotachylites. So a fully symmetrical "rock cycle" that connects all three rock types equally is false. Second, a rock belonging to any of the three rock types can stay where it is and not move around the cycle at all for a long time. Sedimentary rocks can be recycled through sediment again and again. Metamorphic rocks can go up and down in metamorphic grade as they are buried and exposed, without either melting or breaking down into sediment. Igneous rocks sitting deep in the crust can be remelted by new influxes of magma. In fact those are some of the most interesting stories that rocks can tell. And third, rocks aren't the only important parts of the cycle, such as the intermediate materials in the rock cycle already mentionedâ€" magma and sediment. And to fit such a diagram into a circle, some of the arrows have to be longer than the others. But the arrows are just as important as the rocks, and the diagram labels each one with the process that it represents. Notice that all these changes have left out the essence of a cycle, because there is no overall direction to the circle. With time and tectonics, the material of Earth's surface moves back and forth in no particular pattern. The diagram is no longer a circle, nor is it limited to rocks. Therefore the "rock cycle" is poorly named, but it's the one we're all taught. Notice another thing about this diagram: Each of the five materials of the rock cycle is defined by the one process that makes it. Melting makes magma. Solidification makes igneous rock. Metamorphism makes metamorphic rock. All three rock types can be eroded and metamorphosed. Igneous and metamorphic rocks can also be melted. Magma can only solidify, and sediment can only lithify. One way to see this diagram is that rocks are way stations in the flow of material between sediments and magma, between burial and upheaval. What we really have is a schematic of the material cycle of plate tectonics. If you understand the conceptual framework of this diagram, you can translate it into the parts and processes of plate tectonics and bring that great theory to life inside your own head. Share Flipboard Email. Andrew Alden. Geology Expert. Andrew Alden is a geologist based in Oakland, California. He works as a research guide for the U. Geological Survey. Updated September 02, Cite this Article Format. Alden, Andrew. Rock Cycle Diagram. The rock cycle is the process that describes the gradual transformation between the three main types of rocks : sedimentary, metamorphic, and igneous. It is occurring continuously in nature through geologic time. Magma, the molten rock present deep inside the earth, solidifies due to cooling and crystallizes to form a type of rock called igneous rocks. Cooling of igneous rocks can occur slowly beneath the surface of the earth or rapidly at its surface. Due to weathering and erosional activities, the igneous rocks are broken down to form sediments in the form of gravel, sand, silt, and clay, which gets mixed and pressed together for extended periods to form sedimentary rocks. Over a very long period of time, sedimentary and igneous rocks end up being buried deep underground the soil, usually because of the movement of tectonic plates. Deep below the surface, these rocks are exposed to high heat and pressure, which change them into a different type of rock called metamorphic rock. Igneous, sedimentary, and metamorphic rocks present on the surface of the earth are constantly being broken down by wind and water over a long time. Carrying away of broken rocks by rain, streams, rivers, and oceans to a distant place from their origin. During the carriage of rocks by rivers, the rock particles mixed with soil sink and become a layer of sediment. Often the sediments build up and form small accumulations, which over time and pressure turn into sedimentary rock. Melting of underground metamorphic rock forms magma, which on crystallization forms igneous rock, thus continuing the cycle. Since the rock cycle is a continuous process, the cycle does not stop after the formation of quartzite. Eventually, the quartzite rock could change into a sedimentary or an igneous rock to continue the cycle. Compaction is the process in which sediment is squeezed to reduce the pore space

between the grains due to the weight and pressure of overlying layers. Cementation is the process in which sediments are glued together by minerals that are deposited by water. Both compaction and cementation help in the formation of sedimentary rocks. Your email address will not be published. Save my name, email, and website in this browser for the next time I comment. All rights reserved. Reproduction in whole or in part without permission is prohibited. Rock Cycle. What is the Rock Cycle The rock cycle is the process that describes the gradual transformation between the three main types of rocks : sedimentary, metamorphic, and igneous. It occurs due to: Plate tectonic activity Weathering Erosional processes. Steps of the Rock Cycle. Helping in the formation of soil thus sustaining every life forms on earth Forming life-sustaining minerals such as sodium, iron, potassium, and calcium into the biosphere Forming the energy reserves of the earth like fossil fuels and radioactive sources Providing the building materials used to build structures such as iron, limestone, marble, granite, and basalt Providing raw materials for currency, investments, and adornments such as gold, diamonds, rubies, and emeralds. Who created the concept of the rock cycle? Does the rock cycle stop after the quartzite has formed? What is compaction and cementation in the rock cycle? Article was last reviewed on Monday, November 2, Related articles Parts of a Volcano. Parts of a Comet. Layers of the Ocean. Greenhouse Effect. Leave a Reply Cancel reply Your email address will not be published. Popular Articles Types of Volcanoes. Layers of The Earth. Types of Rocks. Related Worksheets None Found. About Us Contact Us. Rocks are very much known for their rigid nature. Contrary to this, we all should know that rocks too change. They change in property. For this, a high amount of heat and pressure is required. The rate of change in these two factors plays an important role. It occurs under a cycle known as the Rock Cycle. The rock cycle diagram clearly shows all the steps, components of the rock cycle including the end results and the movement of the process. If the diagram does not make sense, a simple explanation of all the steps at play and their end results is given below-. Simply put, weathering is a process of breaking down rocks into smaller and smaller particles without any transporting agents at play. Factors like temperature extremities, biological involvement of nature and water plays the main role. Mainly change of temperature rapidly or at extreme levels causes weathering. IT happens when rocks freeze and thaw. Another scenario is when tectonic plates pressure changes suddenly causing fissures. Usually occurs in rocky or mountainous places. Usually occurs with rainwater trying to react with the rock minerals and create other minerals or chemical compounds. Usually happens in damp and warm places since reactions take place at higher temperatures. Erosion too is the natural process of breaking down rocks into sand-like particles. The only difference between weathering to erosion is the presence of agents like water and wind. In the previous one, water was only present as a factor for reactions to take place while in erosion, it acts as a transporting agent too. Various events like attrition, abrasion and solution, wind transportation give rise to caves, new tributaries, and cracks in big rocks while wind transportation gives rise to thinned down rocks. Sediment is the constant deposition or settling down of small particles of sand, pebbles, etc. It is usually done by-. The next step to the process of sedimentation is burial and Compaction. The process is very simple. Once the sand particles are sedimented, they create layers which are soon covered by another layer of new sediments and the process goes on. This gives rise to pressure on the sedimented layers below. Meanwhile, the minerals in the water act as a slow cohesive agent between the particles. Thus, soft layers turn into solid rocks with minerals inside. Magma is basically lava that remains dormant inside the volcanoes. Magma is the liquid form of rocks under great pressure and temperature due to heat from the earth core. Magma can be both sticky or less viscous. It depends on factors like temperature and amount of dissolved gas. The less viscous erupt and form porous rocks with fine grains while the more viscous ones form solid rocks with distorted grains. The reverse of the previous process is melting. As soon as the rocks reach the bottom of the earth, the more the temperature rises and so does the pressure. Soon, they melt and give rise to melted rocks called lava. This, in turn, is erupted only to cool down at the surface to form rocks. Some rocks do not erupt and are forced to change characteristics to give rise to new forms of rock. The process of forming a crust of earth upwards due to natural forces causing movements in the tectonic plates is called uplifting. This is how mountains rise higher while new islands come up in the middle of the oceans. The constant pressure and sudden movements put some sedimentary and igneous rocks under great pressure. Such forces can create folds or fissures among the rocks and among all these events, rocks deform to create metamorphic rocks. Deformation basically means folding and faulting of rocks. This is caused by compression and tension. Igneous rocks are formed from cooled magma and are often either very rigid or porous depending on the place of cooldown. They have minerals in the form of crystals which are often very visible. When Igneous, Sedimentary or Metamorphic rocks undergo immense pressure and heat, the shape of the rocks change. Under such

circumstances, some of the properties of the rocks change giving rise to new forms of rock known as metamorphic rocks. The process might even repeat on metamorphic rocks again. Rocks that are formed from constant sedimentation followed by increased pressure and heat. Meanwhile, the minerals act as a cohesive agent and thus, sedimentary rocks are formed. The constructing particles can range from sand to pebbles. The main feature is undoubtedly visible strata and beds. Rock Articles. What is Rock? Rock Cycle - Process Steps. Igneous Rock. Uses of Sediment ary Rocks. Please note that the information in Civiltoday. The information provided should not be used as a substitute for professional services. Cement Hydraulic Cement. Bridge Building Equipment Wall. Process Steps with Diagram. It can be broken down into chemical, physical and biological influencing agents. Physical Mainly change of temperature rapidly or at extreme levels causes weathering. Chemical Usually occurs with rainwater trying to react with the rock minerals and create other minerals or chemical compounds. Three major reactions are- Hydrolysis - Acidic reacti

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 on, soluble salt, and clay formation. Oxidation - Formation of rocks rich in iron in the presence of oxygen. Solution - CO_2 in the presence of rainwater can dissolve limestones to give new stones. Biological The living world contributes to rock breakdown by- Boring through rocks for protection Cracking rocks under pressure while growing. Breaking down rocks o build houses. Releasing acid in order to extract nutrients from rocks for survival. It is usually done by- Wind and water - Water in the rivers and glaciers from mountains slowly erode sand particles and create layers of sediments. Biological Influence - Living organisms die and get sedimented under great pressure to form rocks. Evaporation - Chemicals like $CaCO_3$ and NaCl are sedimented in troughs and seashores to create limestones and rock salts respectively. Rock Articles What is Rock? Disclaimer Please note that the information in Civiltoday. Subscribe Us To get regular update and new article notification please subscribe us.