Name _____ Date _____ Period _____

# Unit 5 Rock Cycle and Geological Time Webquest

## Activity #1: An Overview of Earth History

*Open An Overview of Earth History Read and fill in the blanks.*

The Earth has been around for approximately _____ years! The _____ _____ _____ is a timeline that describes all this time.

Scientists have found rocks that formed during every time period of Earth's history! In _____ _____, they have found millions of _____ and _____ to past environments.

*Open The Earth's Geologic Time Scale*

What is a(n)

eon?

era?

epoch?

age?

Now, put eon, era, epoch, and age in order from largest to smallest amount of time.

largest → smallest

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*Complete the geological time scale by filling in the information from here. You only need to summarize the pivotal events. Boxes that are gray do not need to be filled in. (MYA = million years ago)*

| Eon | Era | Period | Epoch | Pivotal events |
|---|---|---|---|---|
| Phanerozoic<br>540 mya through today | Cenozoic<br>65 mya through today | Quaternary Period<br>1.8 mya to today | Holocene | |
| | | | Pleistocene | |
| | | Tertiary Period<br>65 to 1.8 mya | Pliocene | |
| | | | Miocene | |
| | | | Oligocene | |
| | | | Eocene | |
| | | | Paleocene | |
| | Mesozoic<br>248 to 65 mya | Cretaceous<br>146 to 65 mya | Upper | |
| | | | Lower | |
| | | Jurassic<br>208 to 146 mya | | |
| | | Triassic<br>248 to 208 mya | | |
| | Paleozoic<br>540 to 248 mya | Permian<br>280 to 248 mya | | |
| | | Carboniferous<br>360 to 280 mya | Pennsylvanian | |
| | | | Mississippian | |
| | | Devonian | 408-360 mya | |
| | | Silurian | 438-408 mya | |
| | | Ordovician | 505 -438 mya | |
| | | Cambrian | 540-500 mya | |
| Proterozoic | 2.5 bya-540 mya | Vendian/Ediacaran<br>600-540 mya | | |
| Archeozoic | 3.9-2.5 bya | | | |
| Hadean | 4.6-3.9 bya | | | |

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**Activity #2: Rock and the Rock Cycle**

*Open Rock and the Rock Cycle. Read and fill in the blanks.*

All rock (except for meteorites) that is on Earth today is made of the _____ stuff as the rocks that dinosaurs and other ancient life forms walked, crawled, and swam over. While the stuff that rocks are _____ from stays the _____, the rocks _____. Over millions of years, rocks are _____ into other rocks. Moving _____ help to _____ and _____ many types of rocks.

*Open What is a cycle? Read and fill in the blanks.*

Very simply, when scientists talk about cycles, they are talking about _____ of events that repeat themselves. Some cycles are very _____. Other are very _____ cycles.

**Activity #3 Rock Cycle**

*Open Interactives Rock Cycle. Click "Begin with Types of Rocks." Read and fill in the blanks.*

The three main types, or classes, of rock are _____, _____, and _____ and the differences among them have to do with how they are _____.

_____ rocks are formed from particles of _____, _____, pebbles, and other fragments of material. Together, all these particles are called _____. Gradually, the sediment accumulates in layers and over a long period of time hardens into _____. Generally, sedimentary rock is fairly _____ and may break apart or crumble easily. You can often see sand, pebbles, or stones in the rock, and it is usually the only type that contains _____.

Examples of this rock type include _____ and _____.

_____ rocks are formed under the _____ of the earth from the metamorphosis (change) that occurs due to intense _____ and _____ (squeezing). The rocks that result from these processes often have ribbonlike layers and may have shiny crystals, formed by minerals growing slowly over time, on their surface.

Examples of this rock type include _____ and _____.

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_____ rocks are formed when _____ (molten rock deep within the earth) cools and hardens. Sometimes the magma cools inside the earth, and other times it erupts onto the surface from volcanoes (in this case, it is called _____). When lava cools very quickly, _____ _____ form and the rock looks _____and _____. Sometimes gas bubbles are trapped in the rock during the cooling process, leaving tiny holes and spaces in the rock.

Examples of this rock type include _____ and _____.

*Open How Rocks Change. Read and fill in the blanks. When you have completed reading the section, click on the animation on the right hand of the screen. You can either draw or describe the animation at the bottom of the appropriate section on this packet. When you are done click "Next"*

**Heat & Pressure**

What happens to cookie dough when you put it in the oven? The _____ of the oven produces changes in the ingredients that make them interact and combine. Without melting the dough, the heat changes it into a whole new product — a cookie.

A similar process happens to rocks beneath the earth's surface. Due to movements in the _____, rocks are frequently pulled under the surface of the earth, where temperatures _____ dramatically the farther they descend. Between 100 and 200 kilometers (62 and 124 miles) below the earth's surface, temperatures are hot enough to melt most rocks. However, before the _____ point is reached, a rock can undergo fundamental changes while in a solid state — morphing from one type to another without melting.

An additional factor that can transform rocks is the _____ caused by tons of other rocks _____down on it from above; _____ and _____ usually work together to alter the rocks under the earth's surface. This kind of change, which results from both rising temperature and pressure, is called _____, and the resulting rock is a _____rock.

*Describe the animation:*

Name _____ Date _____ Period _____

**Melting**

What happens to a chocolate bar when it gets very hot? It _____.

The same thing happens to a rock when it is heated enough. Of course, it takes a lot of heat to melt a rock. The _____ temperatures required are generally found only _____ within the earth. The rock is pulled down by _____ in the earth's crust and gets hotter and hotter as it goes deeper. It takes temperatures between 600 and 1,300 degrees Celsius (1,100 and 2,400 degrees Fahrenheit) to melt a rock, turning it into a substance called _____ (molten rock).

*Describe the animation:*

**Cooling**

What would you do to turn a melted chocolate bar back into a solid? You'd _____ it by putting it into the refrigerator until it hardens.

Similarly, liquid magma also turns into a solid — a _____ — when it is cooled. Any rock that forms from the cooling of magma is an _____ rock. Magma that cools quickly forms one kind of igneous rock, and magma that cools slowly forms another kind.

When magma rises from deep within the earth and explodes out of a volcano, it is called _____, and it cools _____ on the surface. Rock formed in this way is called _____ igneous rock. It is extruded, or pushed, out of the earth's interior and cools outside of or very near the earth's surface.

What if the magma doesn't erupt out of a volcano, but instead gets pushed slowly upward toward the earth's surface over hundreds, thousands, or even millions of years? This magma will also cool, but at a much slower rate than lava erupting from a volcano. The kind of rock formed in this way is called _____ igneous rock. It intrudes, or pushes, into the earth's interior and cools beneath the surface.

*Describe the animation:*

Name _____ Date _____ Period _____

**Weathering & Erosion**

What do dandelions rely on to separate their seeds, carry them, and deposit them elsewhere? The wind.

All objects on the earth's surface are exposed to the _____, along with many other elements — _____, the _____, _____ changes. Over time, these factors wear objects down and break them apart. The resulting bits and pieces of material are called _____. Sediment is then transported by _____ and _____, often ending up far from where it started. These processes of breakdown and transport due to exposure to the environment are called _____ and _____. Weathering and erosion affect all rocks on the earth's surface.

*Describe the animation:*

**Compaction & Cementing**

What happens to a loose pile of garbage when it's put into a compactor? The squeezing of the machine produces a solid cube of compacted garbage.

The same thing happens to _____ formed from the weathering and erosion of rock. Over time, sediment accumulates in oceans, lakes, and valleys, eventually building up in layers and _____ down the material underneath. This weight _____ the _____ particles together, compacting them. _____ passing through the spaces in between the particles helps to _____ them together even more. This process of compacting and cementing sediment forms sedimentary rock.

*Describe the animation:*

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*Open Transform the Rock. Write in the questions / equations.*

*1.*

*2.*

*3.*

*4.*

*5.*

*Open the Rock Cycle Diagram. Read and fill in the blanks.*

A useful way to illustrate how the three main types of rock are related to one another and how changes to rocks happen in a recurring sequence is the _____ _____. It can be presented in a diagram like the one below.

The concept of the rock cycle is attributed to James Hutton (1726—1797), the 18th-century founder of modern geology. The main idea is that rocks are continually changing from one type to another and back again, as forces inside the earth bring them closer to the surface (where they are _____, _____, and _____) and forces on the earth sink them back down (where they are _____, _____, and _____). So the elements that make up rocks are never _____ or _____— instead, they are constantly being recycled. The rock cycle helps us to see that the earth is like a giant rock recycling machine!

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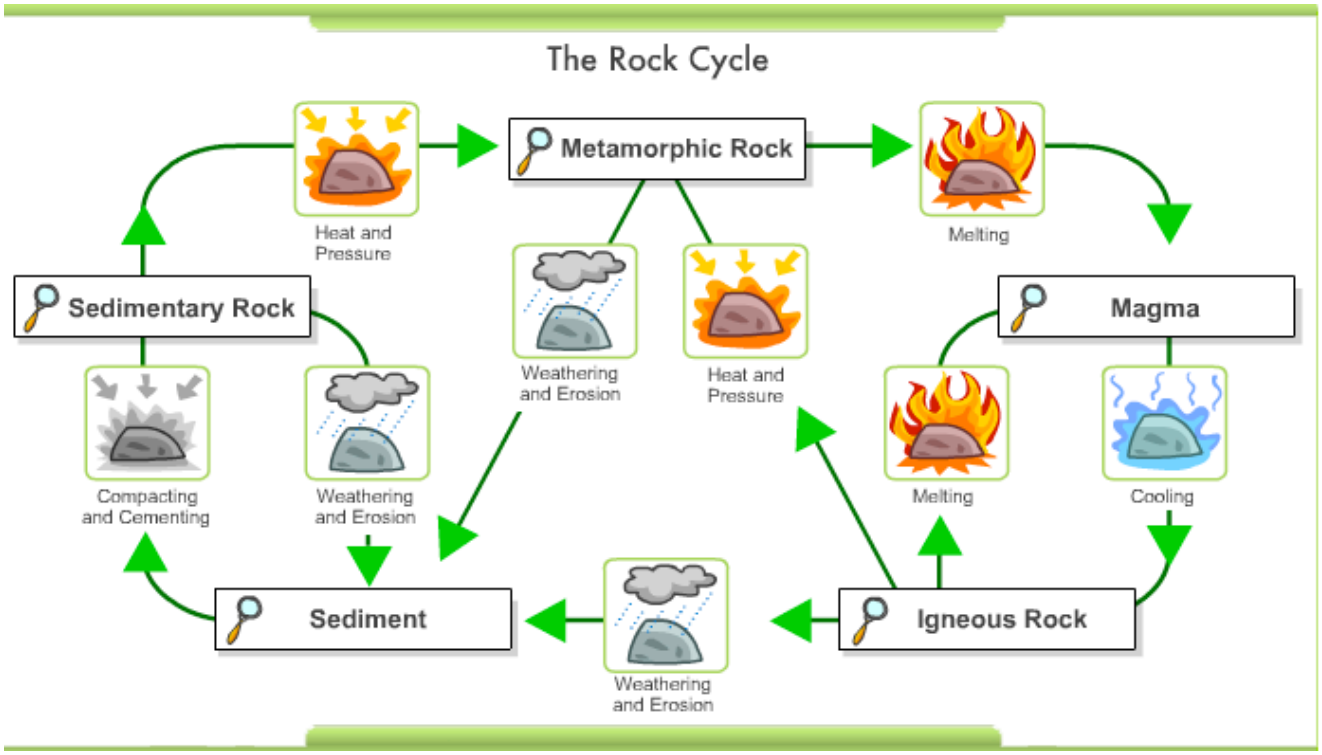


*Open Complete the Cycle. Record your results here _____. Teacher's initials _____.*

*Open Test Your Skills. Record your results here _____. Teacher's initials _____.*