

Volcanos at your doorsteps!!!

VOLCANOS!

Mount Rainier

By Janelle Pyant



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THE INTRODUCTION

<https://www.goodfreephotos.com/albums/united-states/washington/mount-rainier-national-park/scenic-view-of-peak-of-mount-rainier-washington.jpg>

Have you ever seen Mount Rainier on the horizon? Or have you ever visited Mount Rainier National Park? It was one of the first sites I noticed when my family and I moved to the state of Washington. As we drove down the highway, in my parent's car, I would point it out to my brothers and sisters. But nothing compares to visiting the actual volcano, the one that I can see from my doorstep.

Mount Rainier is a stratovolcano, also called a composite volcano. A stratovolcano is built on alternating layers of lava and ash that forms a cone shape. The cone is built upon many layers of hardened lava and tephra. Tephra is rock fragments and particles ejected by a volcanic eruption. At 14,411 ft above sea level, Mount Rainier is the tallest mountain in Washington and is part of the Cascade Range.

Mount Rainier is known by many names. Believe it or not, for a brief time in 2014, the Washington State Senate passed a resolution, temporarily renaming the mountain Mount Seattle Seahawks in honor of the team's Super Bowl bid. But just like Cinderella's wonderous garments, the change only lasted until midnight, before it reverted to its original name after the game concluded on February 3, 2014.

In 1792, Explorer George Vancouver was surveying the Pacific Ocean and observed the mountain. He decided to name the mountain after a friend, Rear Admiral Peter Rainier. Today there is a great debate about restoring the mountain's name given to it by the Indigenous people. Some of the names include Tahoma, which means "snowy peak." Talol, or "mother of waters," and Mount Tacoma, "place where the water begins." Isn't it ironic that Mount Rainier is only about 40 miles southeast of the city of Tacoma? Currently, there is not a groundswell of support to change the name of the mountain, however, people are talking about it.

Wildlife is plentiful in Mount Rainier National Park. There are also many animals, birds, fish, reptiles, and amphibians living near Mount Rainier. Mount Rainier National Park is home to over 280 species of wildlife. Animals such as elk, deer, marmots, pikas, and mountain goats live on the mountain. Reptiles such as the common garter snake, rubber boa, and northern alligator lizard live there too. Marbled murrelets, bald eagles, and peregrine falcons are some of the endangered species that make the mountain home.

Many people visit Mount Rainier National Park yearly. There are many hiking trails, campsites and some people even venture to climb the mountain. Sounds fun right? Since I've always admired Mt Rainier from a distance, it was time for me to get up-close to look at this breathtaking Volcano.

On January 13, 2023, my family and I went to Mt Rainier National Park. We drove to the park looking at the beautiful views, the dark green pines, and the cobalt-blue water. The Pacific Northwest is very beautiful!

When we got to the park, it wasn't that cold but there was a lot of snow. My brother kept trying to throw snowballs at me. We went to the National Park Inn and bought the most delicious fries I'd ever tasted. They were the best.

After that, we went to the Longmire Visitors Center, and I found a lot of interesting facts about Mt Rainier.



Then we hiked the Trail of the Shadows, which was 0.7 miles. One thing that interested me on the trail was a creek with orange water. The water looked an orangish color because "Hot water dissolves iron as it circulates past underground rocks. Iron oxidizes (rusts) when it is exposed to the air and the resulting iron oxyhydroxides deposit a reddish pigment along the spring channel.", National Park Service. The water in the lake was also bubbling.

"When the water vapor bubbles try to rise, they are impeded by the linkage of silica chains in the magma and can rise only slowly. The rapid change in confining pressure as the magma body rises to the surface causes the dissolved water vapor bubbles to expand and escape explosively.",

<http://www.waterencyclopedia.com/Tw-Z/Volcanoes-and-Water.html>

There were so many signs at the park to read and so much information to remember. I wanted to take notes, but it started raining so I had to commit all that I'd seen to memory. We had an amazing time at Mt Rainier National Park. However, in all its beauty, we must remember that it is an active composite volcano and there can be many dangers on Mount Rainier.

Mt. Rainier is potentially the most dangerous volcano in the Cascade Range. Even though it has not had a significant eruption in 500 years, it is listed as one of the deadliest volcanoes in the world.

Why is Mt. Rainier dangerous?

Mt. Rainier is dangerous because of its high elevation, frequent earthquakes, and extensive snow and glacier ice. When you combine these factors with a densely populated area in its vicinity, there would be devastating consequences. Experts predict if it were to erupt, it would cause one of the worst natural disasters in U.S. History.

A black and white photograph of a powerful volcanic eruption. A massive, dark, and highly textured plume of ash and smoke billows upwards from the summit of a conical volcano. The plume is dense and turbulent, with visible internal structures of ash and gas. The volcano's slopes are steep and appear to be covered in ash or lava flows, with some lighter-colored areas possibly representing snow or different rock types. The sky is filled with the lower part of the ash cloud, creating a dramatic and somewhat somber atmosphere.

THE ERUPTION

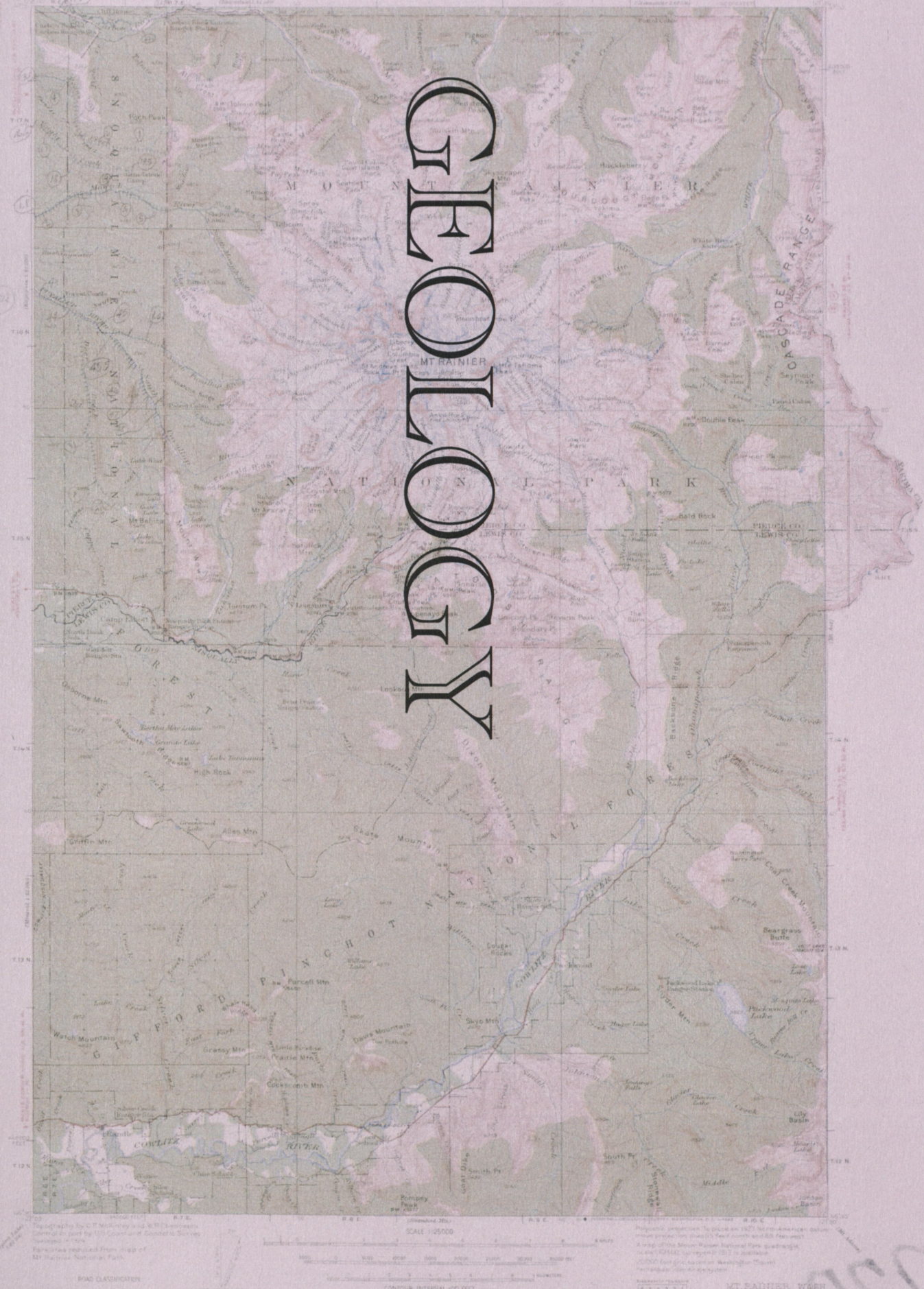
The Cascade Range is at least 37 million years old. It is a major mountain range of western North America, extending from southern British Columbia through Washington and Oregon to Northern California. It includes both non-volcanic mountains such as the North Cascades and notable volcanos known as the High Cascades.

The latest volcanic eruptions there are Mt Rainier (1894), Mt St. Adams, and Mt St. Helens (1980). Most Volcanos form on the borders of tectonic plates. When two tectonic plates collide with each other and one subducts beneath the other, this is called a subduction zone. Mt Rainier is on the Juan de Fuca plate.

On Wednesday, September 7, 2022, many people claimed to have seen Mt Rainier venting gas. Geologists and the United States Geological Survey (USGS) confirmed that it was not erupting. It got so bad that the National Park Service tweeted, "Mount Rainier is NOT erupting. We have looked at the cloud that has caused concern from multiple webcams and have determined that it is a lenticular cloud. In addition, the USGS reports no indications of unusual seismic activity." But when was the last time Mount Rainier exploded?

The last time Mount Rainier erupted was in 1894-95 but the last major eruption was 500 to 600 years ago. Over the past million years, Mount Rainier has erupted many times, alternating between periods of high output and low output eruptions.

GEOLOGY



Mt Rainier has built upon 4 periods of volcanic activity.

During stages of high output, lava flows travelled up to 15 mi from the summit, and in times of low volcanic output, the lava flows rarely ever exceeds 5 mi from the summit. Eruptions slowed 160,000 years ago. Erosion removed a lot of the north and south flanks reducing Mt Rainier's elevation. The upper east flank fed lava flows making the Little Tahoma, one of Mt Rainier's most noticeable subpeaks.

Lahars, which are more deadly than lava flows, are a mixture of water and rock fragments move up to forty miles per hour. Mount Rainier's possibility of lahars makes it one of the most dangerous mountains in the Cascade Range. Some of the strongest lahars reached beyond the park's borders. In the Holocene Epoch, three of the largest lahars reached the Puget Sound! The Osceola Mudflow that was about 5600 years ago resulted from a summit eruption that brought debris down into the White River. The National Mudflow, happening about 2,200 years ago, poured into the Nisqually River. The Electron Mudflow, which might or might not have been triggered by volcanic activity, happened 500 years ago, and ran down the Puyallup River. These kinds of lahars which can happen without warning raise concern among geologists.

There are two kinds of lahars meltwater-generated lahars and landslide-generated lahars. Mount Rainier has more than a cubic mile of glacial ice, which as much as all the other Cascade Range volcanos combined. During past eruptive episodes, the quick melting of snow and ice by volcanic flows and other events causes landslides. Landslides can be triggered when magma intrudes in a volcano and destabilizes it, or they can be caused by large earthquakes. They may also be the result of failure of rocks that were weakened by the action of acidic fluids. Magma releases gases and heat making hot, acidic groundwater, which can over time cause hard volcanic rock to change into weak, clay-rich rock by a process called hydrothermal alteration. When the water-saturated, clay-rich rocks slide away from the mountain, it turns into a lahar.

Other debris flows have happened many times, the most famous being the Kautz flood in flood of 1947.



It lasted 20 hours, removing ice from the Kautz Glacier and ripping out a section below the terminus two and one-half miles long and 60 ft deep. This mighty flow caused trees to be torn from their roots and made rocks, silt, and giant boulders fall. The riverbed near Nisqually become 6 ft higher!

In 1963, massive rockfalls from the Little Tahoma Peak fell on top of the Emmons Glacier. These caused at least seven avalanches of rock debris that traveled for four miles into the White River Valley. This might have caused a small eruption near the base of the Little Tahoma. These avalanches can be up to 70 mph. If you ever hike near the mountain in summertime, you can hear the rumbling of the avalanches of rock and ice. Mount Rainier is always awake.



THE CONCLUSION

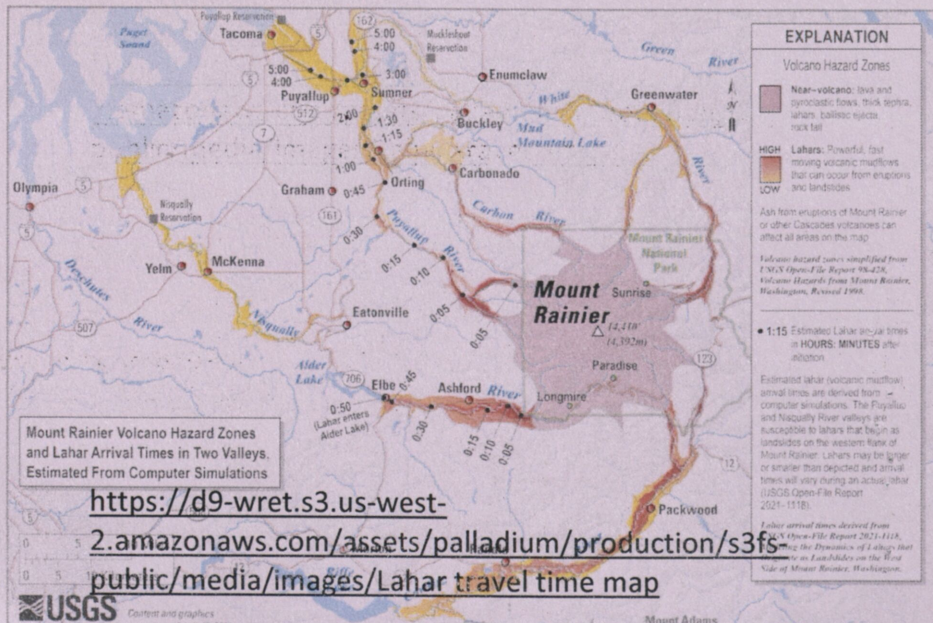
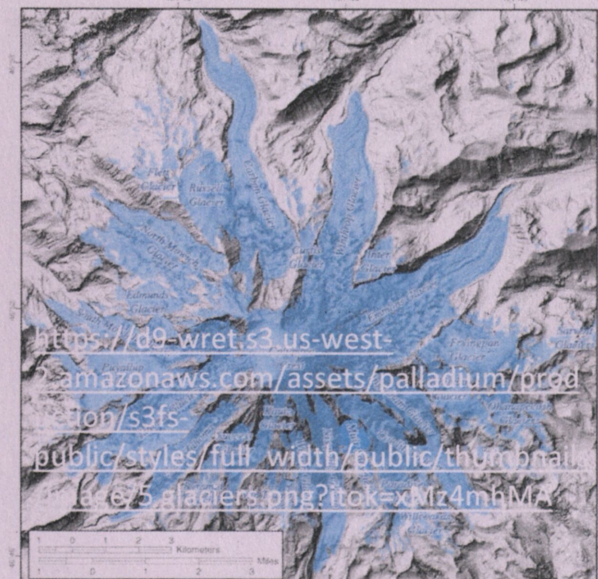
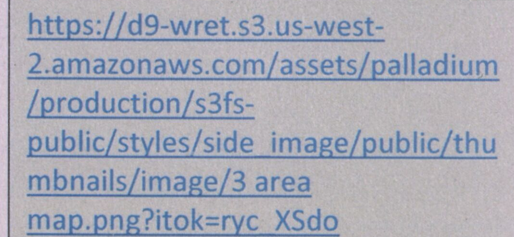
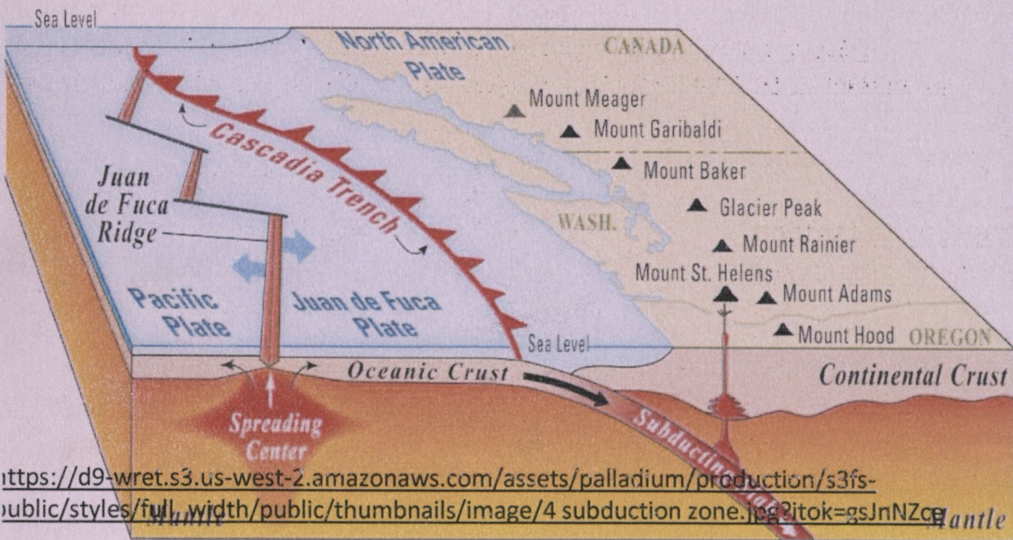
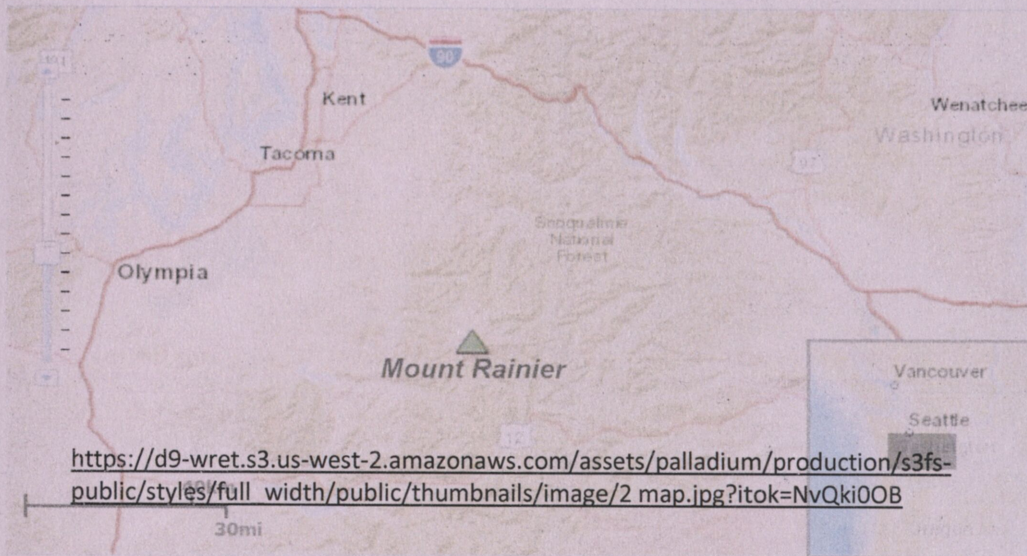
Mount Rainier has made a great impression upon many. It contains many animals such as the Black Bear, Black-tailed Deer, Elk, Moose, Snowshoe Hare, and more. It has an interesting archaeological and indigenous history.

Although Mount Rainier has many dangers, its beauty is unmistakable, and it is a wonderful mountain to study.

“The mountain receives our expressions and becomes part of us; we imprint our memories upon it and trust it without dearest divisions of our lives. Mt. Rainier does not exist under our feet. Mt. Rainier lives in our minds” — Bruce Barcott, *The Measure of a Mountain: Beauty and Terror on Mount Rainier*.

I loved visiting Mt Rainier, National Park. Mt Rainier will live on in my memories for a lifetime. I hope that one day all of you will get a chance to visit this volcano and I hope it will be as interesting to you as it was to me. Of all the places I have lived, having this volcano at my doorstep has been one of the most interesting.

Maps of Mt Rainier:



Activity Sheet:

Color Mt Rainier:



Vocabulary/Word list

Plate tectonics: “A theory explaining the structure of the earth’s crust and many associated phenomena as resulting from the interaction of the rigid lithospheric plates which move slowly over the underlying mantle.”, *New Oxford American Dictionary Second Edition*.

Lenticular cloud: “A very smooth, round or oval, lens-shaped cloud that is other seen, singly or stacked in groups, near a mountain ridge.”, *New Oxford American Dictionary Second Edition*.

Seismic activity: Seismic activity is a sudden movement of the earth’s crust caused by the release of stress accumulated along geologic faults or by volcanic activity.

Lahar: The word lahar came from Javanese and originated in the 1920’s, it is a destructive mudflow on the slopes of a volcano.

Holocene Epoch: “The Holocene Epoch has lasted from 10,000 years ago to the present day. It covers the period since the ice retreated after the last glaciation and is sometimes regarded as just another interglacial period.”, *New Oxford Dictionary Second Edition*.

MT RAINIER

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ACTIVITY EPOCH ERUPTION HOLOCENE LAHAR LAVA MAGMA
MTRAINIER SEISMIC VOLCANO



Geological Timeline:

EON	ERA	PERIOD	EPOCH	Ma
Phanerozoic	Cenozoic	Quaternary	Holocene	0.01 —
			Pleistocene	0.8 —
		Tertiary	Pliocene	1.8 —
				3.6 —
			Miocene	5.3 —
				11.2 —
				16.4 —
			Oligocene	23.7 —
				28.5 —
			Eocene	33.7 —
				41.3 —
				49.0 —
			Paleocene	54.8 —
				61.0 —
	Mesozoic	Cretaceous	Late	65.0 —
			Early	99.0 —
		Jurassic	Late	144 —
			Middle	159 —
			Early	180 —
		Triassic	Late	206 —
			Middle	227 —
			Early	242 —
	Paleozoic	Permian	Late	248 —
			Early	256 —
		Pennsylvanian		290 —
		Mississippian		323 —
		Devonian	Late	354 —
			Middle	370 —
			Early	391 —
		Silurian	Late	417 —
			Early	423 —
		Ordovician	Late	443 —
			Middle	458 —
			Early	470 —
	Cambrian		D	490 —
			C	500 —
			B	512 —
			A	520 —
				543 —
Precambrian	Proterozoic	Late		900 —
		Middle		1600 —
		Early		2500 —
	Archean	Late		3000 —
		Middle		3400 —
		Early		3800?

https://www.nps.gov/parkhistory/online_books/berkeley/rensch2/rensch2f.htm - :~:text=Director George Otis Smith of the United States,at the same time as Professor Russell%27s report.

<https://geology.com/usgs/rainier/>

<https://www.britannica.com/place/Mount-Rainier>

<https://www.nps.gov/mora/learn/nature/volcanoes.htm>

<https://wnpf.org/2021/10/05/mount-rainier-national-park-an-artists-tour/>

<https://arstechnica.com/science/2014/07/detailed-imaging-of-mount-rainier-shows-subduction-zone-in-glorious-detail/>

Images:

Introduction picture

Eruption picture

Mt Rainier Geological Map

Kautz Flood

Mt. Rainier Map

Mt. Rainier Map 2

Mt. Rainier Map 3

Mt. Rainier Map 4

Mt. Rainier Map 5


Geological Timeline

Conclusion Photo

Back Photo

Activity Sheet:

Color Mt Rainier:



Mount Rainier

a magazine