# Making Geology Magical: Using Videos to Share the Geology of Disneyland

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# Harnessing the magic of Disney

In 2022, over **25 million** people visited the Disneyland Resort and **47 million** people visited Walt Disney World

Opportunity to use the theme parks as a pop culture learning tool

Combine passions in geology and Disney


Real version
in Utah!
Photo: Marli Miller

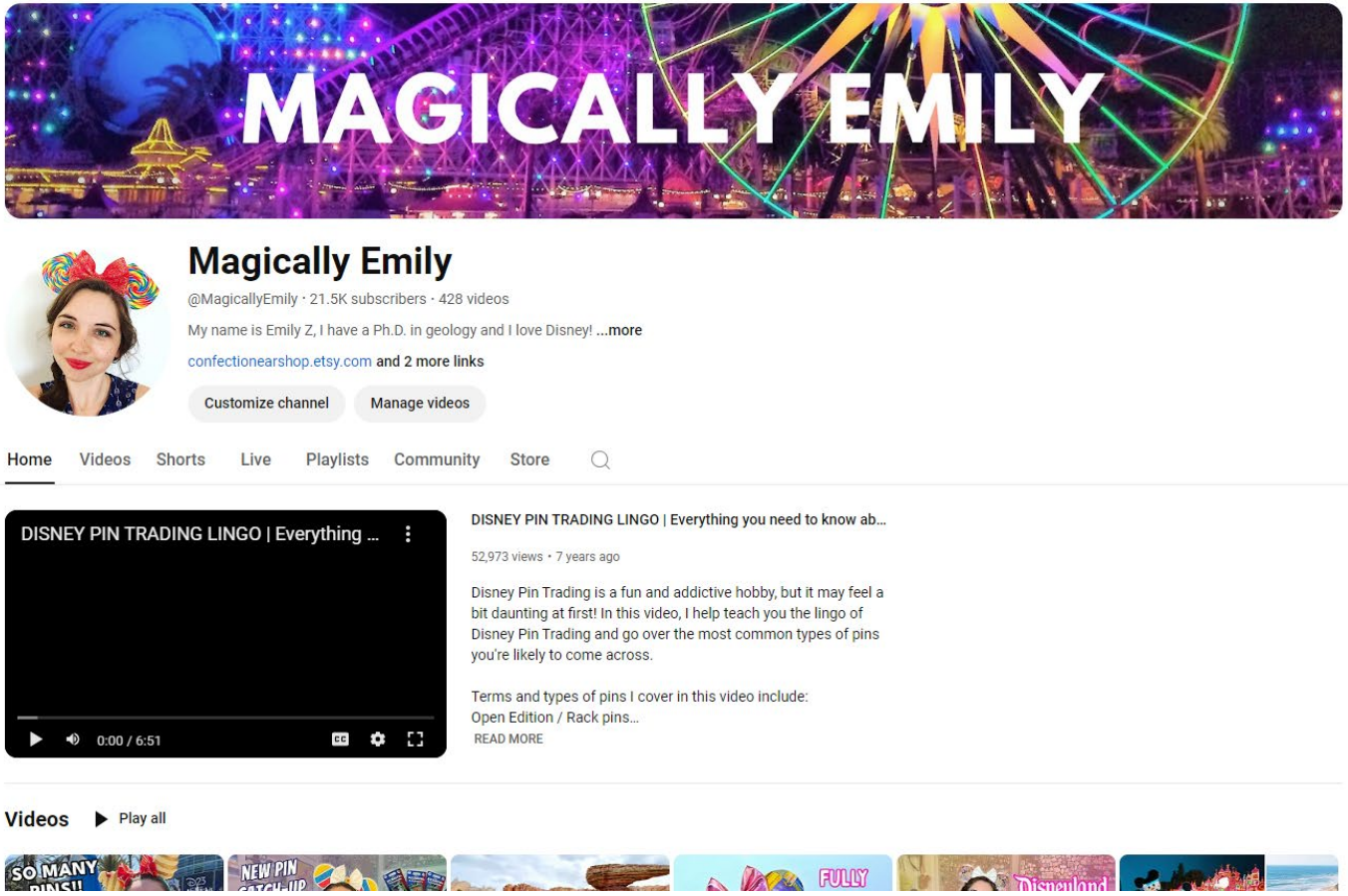

Real version
in Utah!
Photo: Marli Miller

# Disney videos on YouTube

"Magically Emily" YouTube channel since 2017

Over 21,500 subscribers

Disney pins, DIYs, parks, and… geology



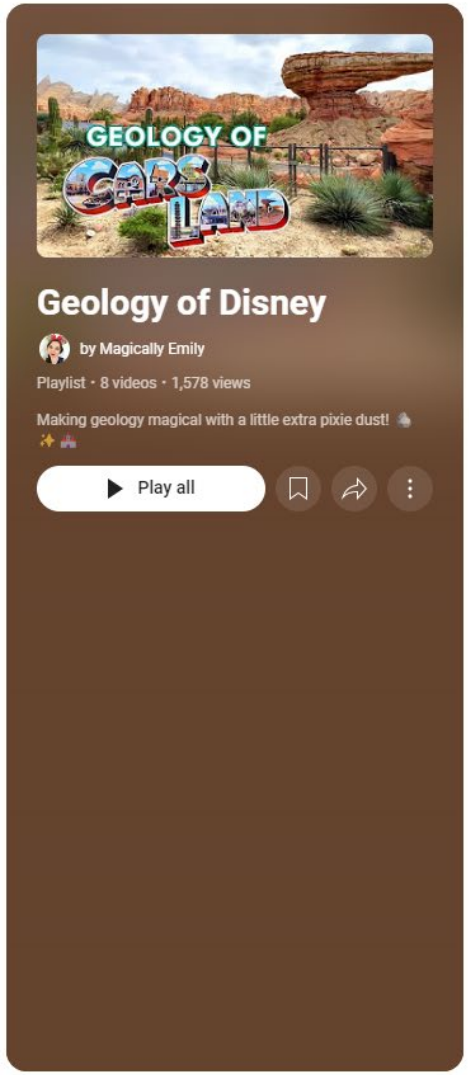
# “Geology of Disney” videos

Six full-length videos

~65,000 views

Share the real geology behind the fake rocks of the Disney theme parks

Geologic setting of the theme parks




1 

The Geology of Cars Land | Disney California Adventure
Magically Emily • 1.1K views • 4 months ago

2 

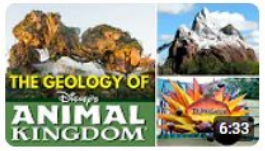
The Geology of Star Wars: Galaxy's Edge | Black Spire Outpost, Disneyland
Magically Emily • 2.8K views • 5 years ago

3 

Could an Earthquake Destroy Disneyland?
Magically Emily • 27K views • 6 years ago

4 

Could a Sinkhole Swallow Walt Disney World?
Magically Emily • 30K views • 7 years ago

5 

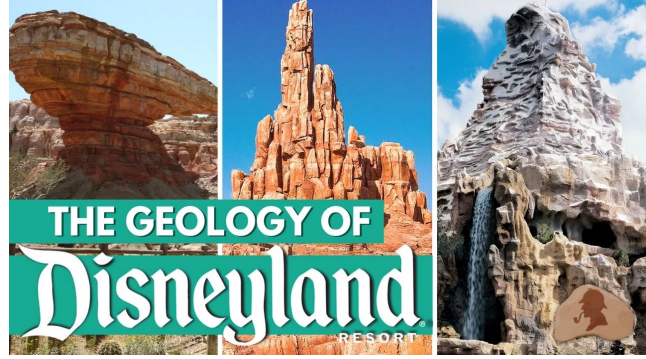
The Geology of Disney's Animal Kingdom
Magically Emily • 966 views • 7 years ago

6 

The Geology of Disneyland
Magically Emily • 1.3K views • 7 years ago

7 
Trilo-Bites at Disney's Animal Kingdom
Magically Emily • 1.4K views • 2 years ago

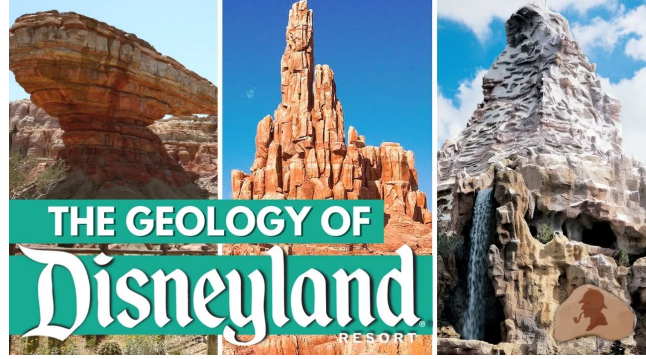
# Geologic recreations




**Matterhorn Bobsleds** rollercoaster directly modeled after Matterhorn mountain of Swiss-Italian Alps (100x shorter)

- Mountain building post-Pangea
- Pyramidal peak glaciation

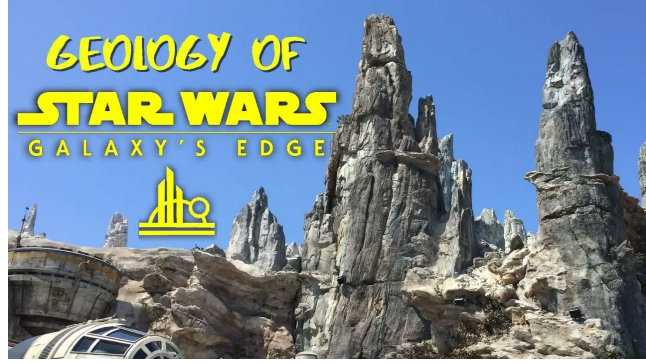
# Geologic recreations




**Big Thunder Mountain Railroad** rollercoaster modeled after hoodoos of Bryce Canyon National Park

- Differential erosion
- Freeze-thaw cycles

# Geologic themed lands



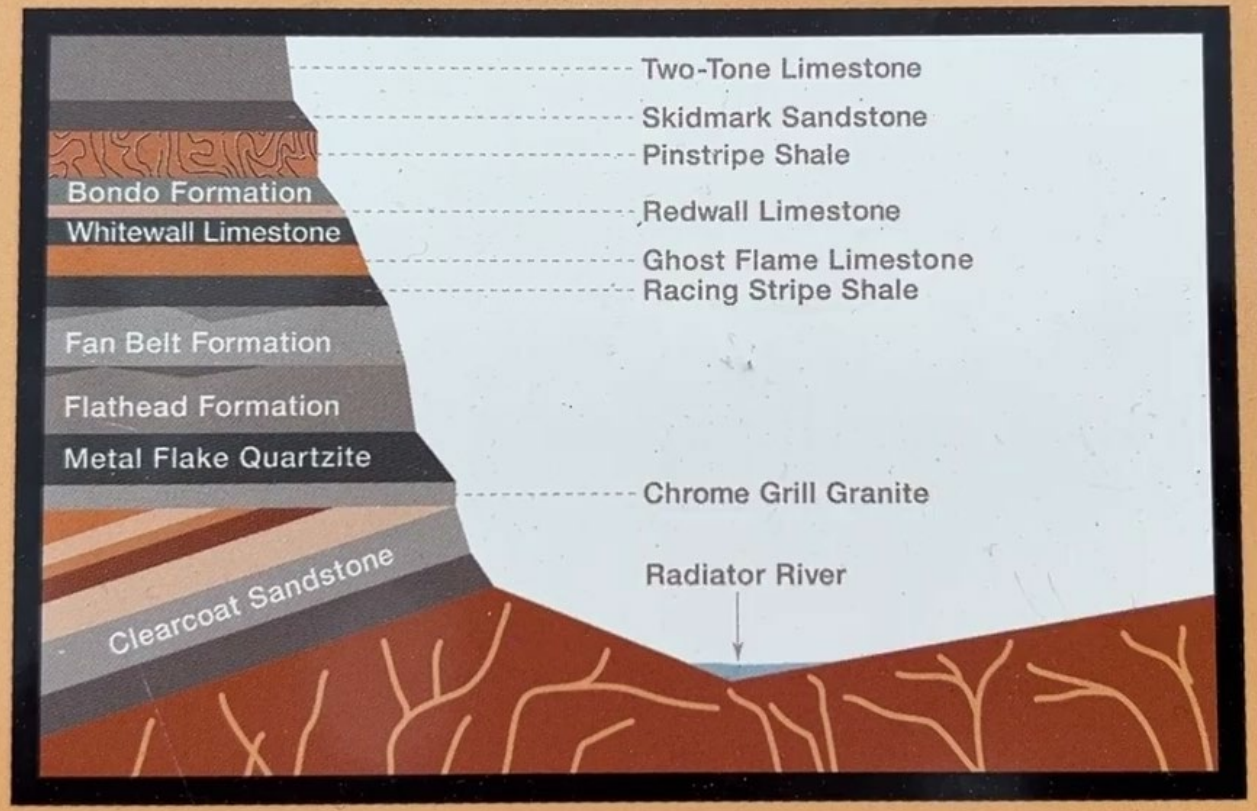

**Star Wars: Galaxy's Edge** creates other-worldly landscape of petrified trees and volcanic deposits (and Disneyland Park has a real petrified tree!)

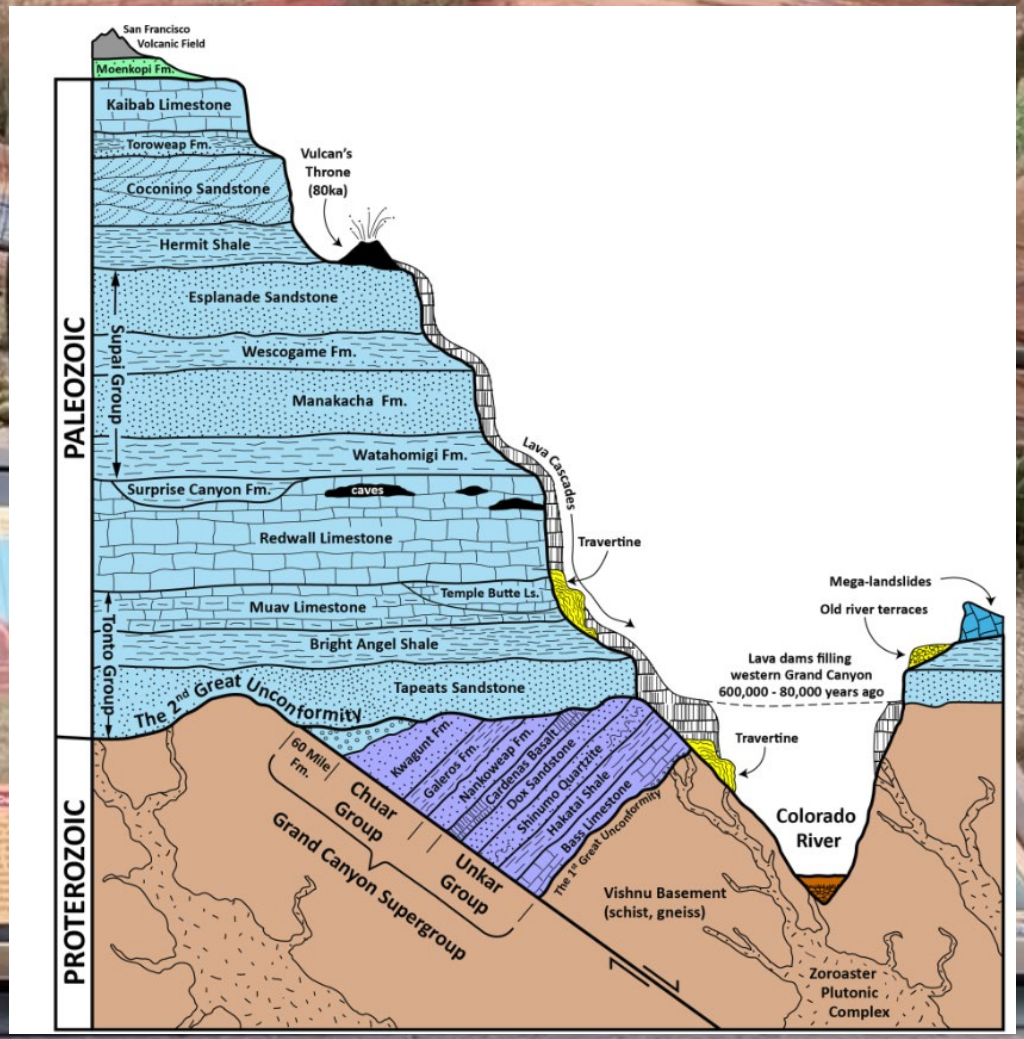
- Petrified Forest National Park
- Bandelier National Monument

# Geologic themed lands


**Cars Land** themed to iconic landscapes of the southwestern US, Monument Valley
- Differential erosion
- Grand Canyon stratigraphy
- Abundant geologic Easter eggs

# Rock Layers


Two-Tone Limestone
Skidmark Sandstone
Pinstripe Shale
Bondo Formation
Redwall Limestone
Whitewall Limestone
Ghost Flame Limestone
Racing Stripe Shale
Fan Belt Formation
Flathead Formation
Metal Flake Quartzite
Chrome Grill Granite
Clearcoat Sandstone
Radiator River


San Francisco Volcanic Field
Moenkopi Fm.
Kaibab Limestone
Toroweap Fm.
Coconino Sandstone
Hermit Shale
Esplanade Sandstone
Supai Group
Wescogame Fm.
Manakacha Fm.
Watahomigi Fm.
Surprise Canyon Fm.
caves
Redwall Limestone
Muav Limestone
Temple Butte Ls.
Bright Angel Shale
Tapeats Sandstone
Tonto Group
The 2nd Great Unconformity
PALEOZOIC
PROTEROZOIC
Vulcan's Throne (80ka)
Lava Cascades
Travertine
Mega-landslides
Old river terraces
Lava dams filling western Grand Canyon 600,000 - 80,000 years ago
Travertine
Colorado River
60 Mile Fm.
Chuar Group
Unkar Group
Grand Canyon Supergroup
Kwagunt Fm.
Galeros Fm.
Nankoweap Fm.
Cardenas Basalt
Dox Sandstone
Shinumo Quartzite
Hakatai Shale
Bass Limestone
The 1st Great Unconformity
Vishnu Basement (schist, gneiss)
Zoroaster Plutonic Complex

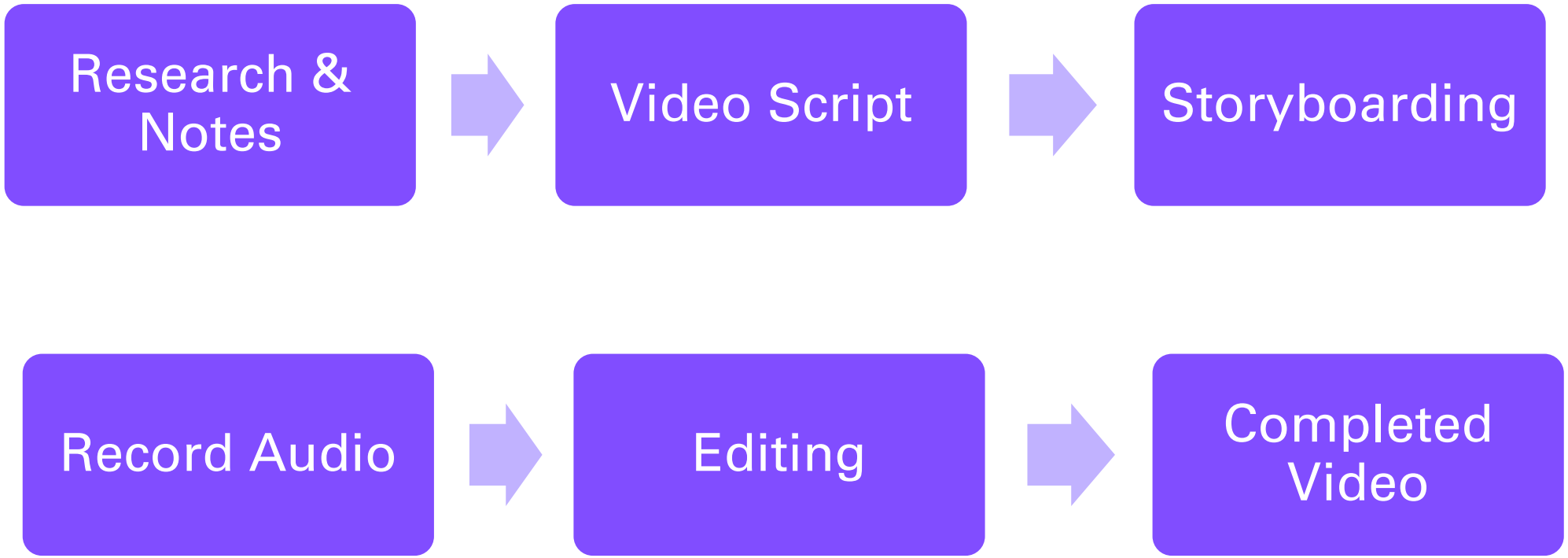
# Geologic setting of the parks

Disneyland Resort, California
Discuss San Andreas Fault and earthquake hazard in SoCal
    Views spike after a felt earthquake at Disneyland


Walt Disney World, Florida
Discuss karst landscape and sinkholes, including sinkhole in Disney park


These videos have 20x more views than other videos, ‘clickable’ thumbnails

# Video making process



# Video making process

Researc
Notes

ryboarding

Record A

ompleted
Video

**How was it formed? breakdown**

These magnificent buttes, pinnacles, and tailfins represent sedimentary layers of soft red shale, sandstone, and limestone exposed by millions of years of wind, rain, and *black ice* erosion.

Other contributors to the ornament formations are the combined forces of the Radiator River and the *Lincoln Continental Drift*.

- Radiator River is stand-in for Colorado River
- Lincoln Continental, the car. Continental Drift was hypothesis developed by Alfred Wegner in the early 1900s that the continents moved or drifted over time; precursor to plate tectonics

Most of the rocks are from the *Automozoic Period*, recording events that took place on the North American continent long before the first wheel ever roamed the earth.

- Play on the different geologic Eras (Paleozoic, Mesozoic, Cenozoic)

The stunning colors of this landscape are created as iron and other minerals stain the steep rock wall surfaces, caves, and wheel wells.

- Individual grains are coated in a thin layer of iron oxide (rust), similar to the candy coating on an M&M
- Redwall Limestone surface is stained red

The Cadillac Range was formed when the westward-moving North American Plate collided with the eastern-moving Pacific Plate. As the plates crashed in this busy intersection they buckled, which caused the mountain range to form at the contact point.

- Subduction of the oceanic Farallon Plate beneath North American Plate impacted western North America from about 180 million years ago to 30 million years ago. At that

# Video making process

Researcl
Notes

ryboarding

Record A

Completed
Video

**The Geology of Cars Land, Radiator Springs | Disney California Adventure**

Pack your bags and get ready to motor west along Route 66, as we uncover the geology of Cars Land in Disney California Adventure.

Cars Land transports guests to the town of Radiator Springs in beautiful Ornament Valley, bringing the setting of the movie to life.

As a geologist and someone who lived in Arizona for nearly a decade, I absolutely love Cars Land. The fictional location of Ornament Valley draws its real-life inspiration from Monument Valley in northeast Arizona and southeast Utah, a truly spectacular southwestern landscape.

And if you know where to look, there are so many wonderful geologic easter eggs in Cars Land that help tell the story of the fictional rocks of Ornament Valley, as well as the very real rocks of the American southwest.

So join me, as I share more than you could ever possibly hope to know about the geology of Cars Land.

Overlooking Radiator Springs Racers, you'll find this viewpoint with National Parks-style signs that highlight the features of Ornament Valley and describe how the rocks formed.

The sign explains that "These magnificent buttes, pinnacles, and tailfins represent sedimentary layers of soft red shale, sandstone, and limestone exposed by millions of years of wind, rain, and black ice erosion."

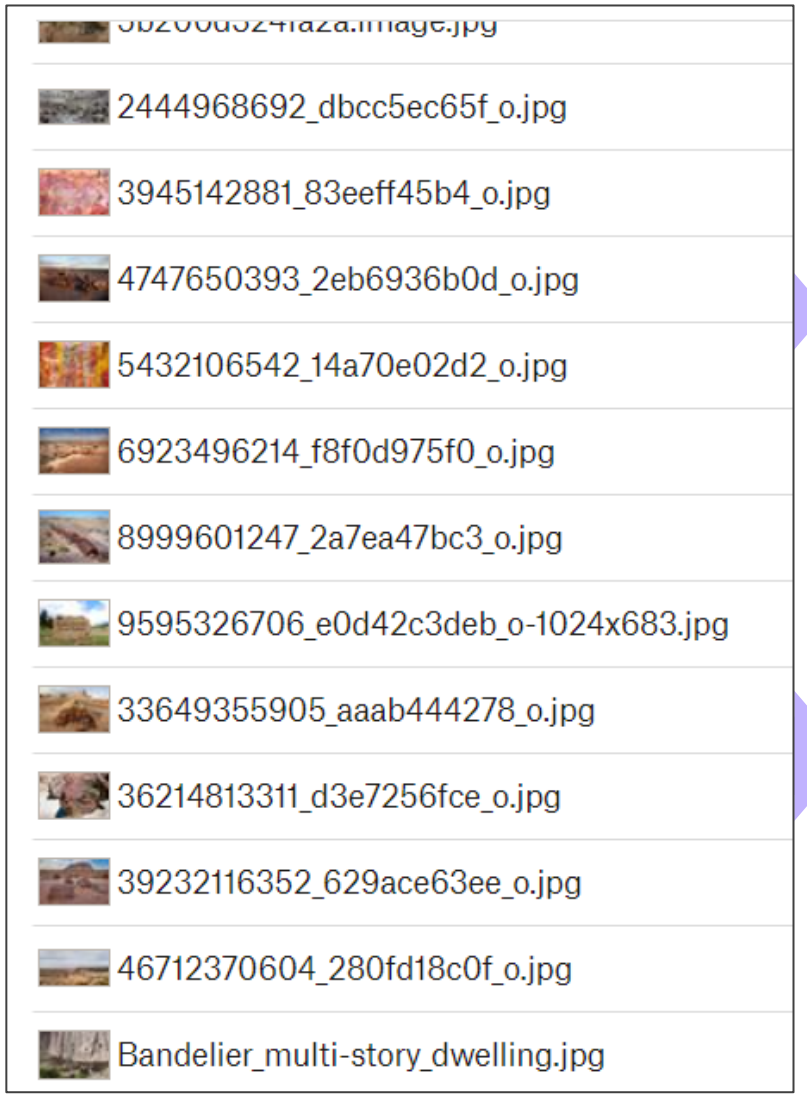
And indeed, shale, limestone, and sandstone are the types of sedimentary rocks that you see all over the southwest, and it's the difference in the properties of these rocks that result in such stunning erosional features, known as differential erosion.

Sandstone and limestone are very strong, erosionally-resistant rocks and they tend to erode to

# Video making process

Research & Notes

Record Audio




Storyboarding

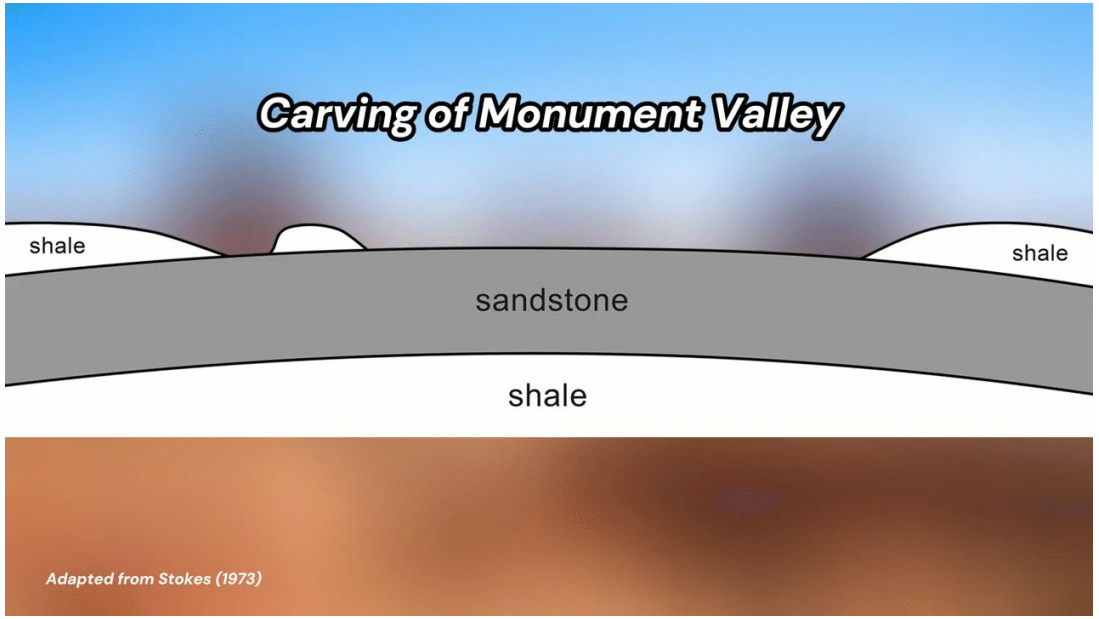
Completed Video

# Footage from the parks

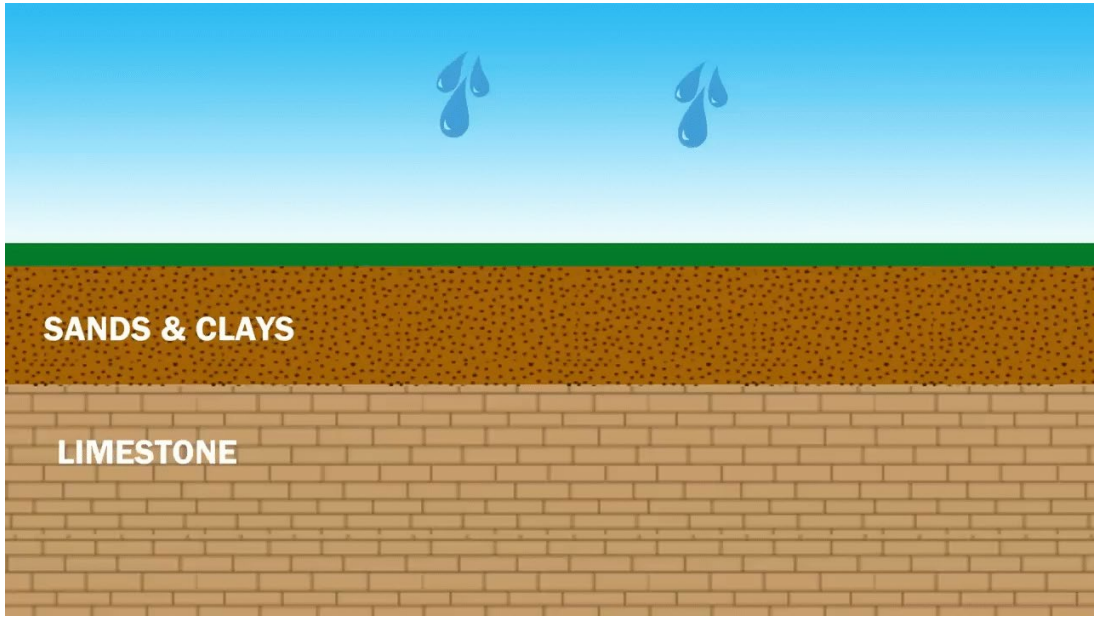
*Geology of Cars Land*

*Geology of Galaxy's Edge*

# Animated segments




*Geology of Cars Land*

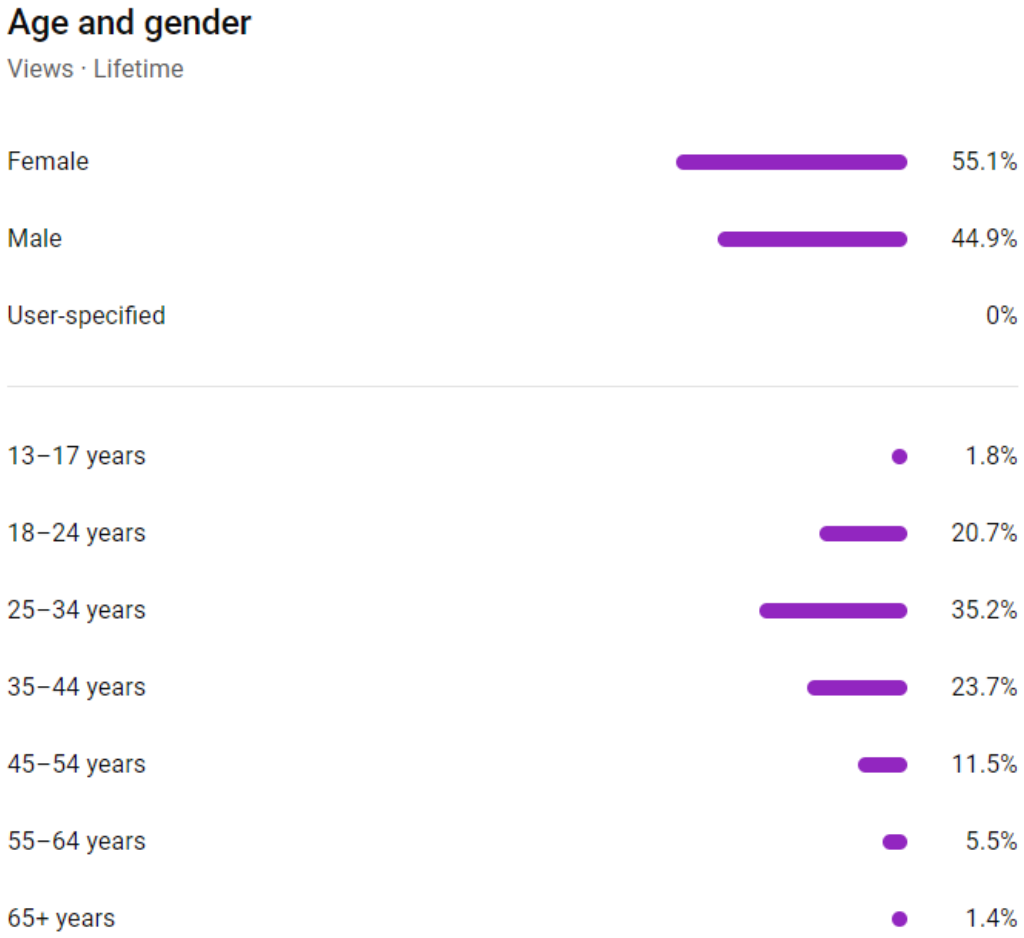



*Disney Word Sinkholes*

# V


US 66
WELCOME to
RADIATOR SPRINGS
GATEWAY TO ORNAMENT VALLEY
POP. 12
ELEV. 160
KNIGHTS OF COMBUSTION
LOYAL ORDER OF THE LUGNUTS
Cover
Watch on YouTube at youtube.com/@MagicallyEmily
Sweet Rel
Let's Do This! - Nat Keefe & Hot Bu
Let' Let'
Wager With Angels - Nathan Mc
Gold in Them Hills - N
Dance of the Fireflies - I
Covid Come Not Near - Nat Keefe
Fractal of Light

# Video viewers

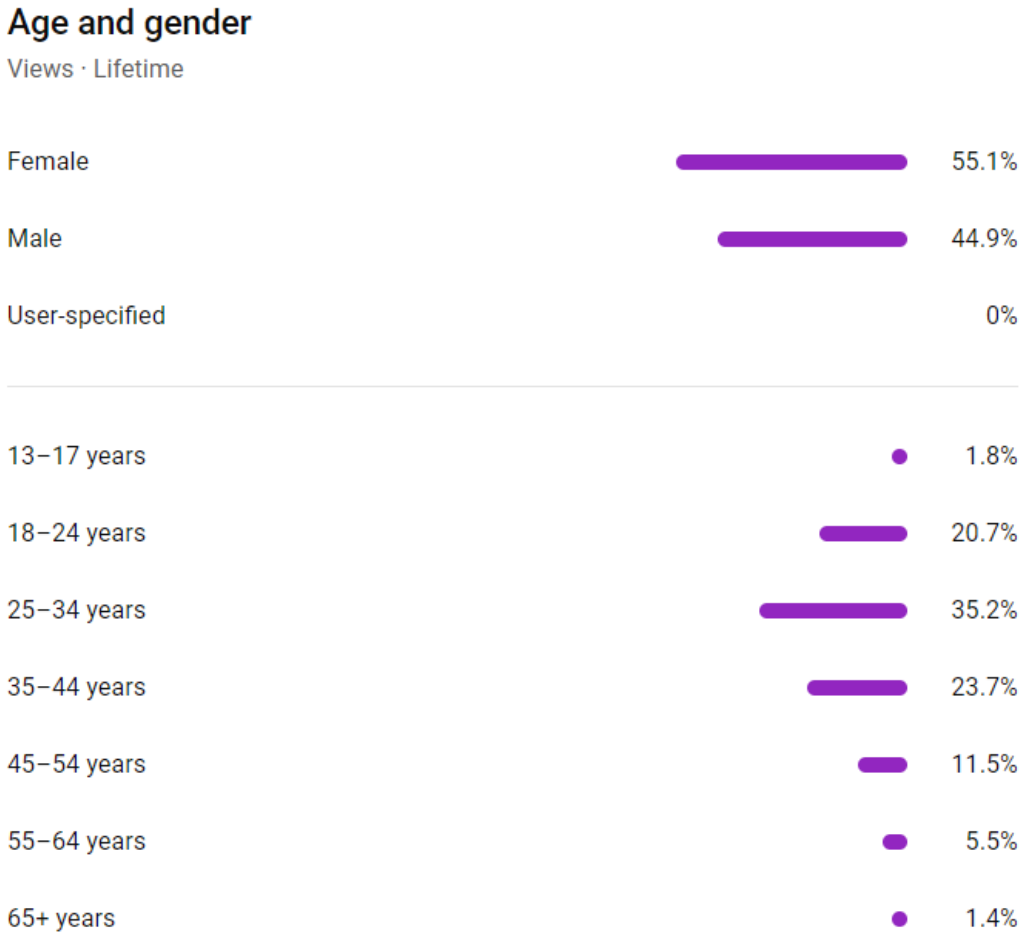



**65,000** total views

**38%** of video views come from YouTube suggested videos

**36%** of video views come from YouTube search

# Video viewers




For Cars Land video:

**34%** of video views came from external searches (Google)

**32%** of video views from Browse features (homepage, subscriptions)

# Outreach impact

“This was such an informative and well-made video! **As someone who's never really connected with most STEM subjects, I was engaged the entire time and found myself wondering what other Disneyland rides could be analyzed like this.**” (Geology of Cars Land)

“Can I just say how much I enjoyed this video? It was so fascinating, and I loved the amount of detail you went into without making it hard to follow along. I adored geology courses in college. I wish more Disney creators would break down aspects of the parks that relate to their areas of expertise and just talk about them. **I adore a good lecture on topics like this!! It makes the magic of the parks come alive for me when you can make these connections to real science and history.**” (Geology of Cars Land)

# Outreach impact

“**I was not expecting to get an earth science lesson today, but I’m glad I did!** I saw a petrified forest in Arizona a few years ago and they are stunning. You did a great job on this video, it was very in depth and well thought out!” (Geology of Galaxy’s Edge)

“**Thank you for bringing science and evidence-based reasoning to the masses!** Petrified wood is so cool and I completely forgot how it's part of the Disneyland theming.” (Geology of Galaxy’s Edge)

# Finding the magic in geology

Plethora of creative ways to combine your passions and interests with geology

Avenue to share geology with people who otherwise may not be interested in science or seek out science content

Videos on YouTube combine researching, writing, graphics, and editing, comprehensive creative endeavor

# Thank you!

Emily E. Zawacki

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(The info on the plaque for the Disneyland petrified tree hasn't been updated since 1957 and is incorrect! The tree is actually 34 million years old!)