

# Forming the Flatirons

## Objectives:

Students will:

- 1) Understand how uplift and erosion created Boulder County's landscape
- 2) Observe a demonstration of how the Flatirons were formed.

## Background:

Most of us have noticed the unique form of the Flatirons formation in Boulder. They are the flat, reddish-brown rocks that tilt up at an angle from the hillside in Chautauqua Park. They are a part of the Fountain Formation, which formed about 300 million years ago. The Fountain Formation was formed by stream-deposited sand, pebbles, and cobbles eroded and carried down from the Ancestral Rockies. The deposits washed out of canyons and streams as alluvial fans, and eventually hardened into rock. When mountain **uplift** resumed about 65 million years ago, the cemented sediment was tilted upward at an angle over 50 degrees. Softer sediments washed away (**eroded**), leaving behind the Flatirons we see today.

## Materials:

2 towels each in red, green, blue and beige.


## Procedure:


Ask students who has seen the Flatirons before. Hold up a picture for those who have not.


Ask them for some ideas about how those rocks got pointed up at such a steep angle from the ground!? Take a few guesses. Discuss briefly the process of **uplift** – when the movement of plates causes land to crunch/smooth together, bend, crack, etc.

Fold towels in half twice and make two identical stacks end-to-end. Explain, as you lay each towel layer down, that each layer represents different rock formations from oldest rock at the bottom to newest formations at the top of the stack as shown:

Post- Cretaceous Seaway rocks 

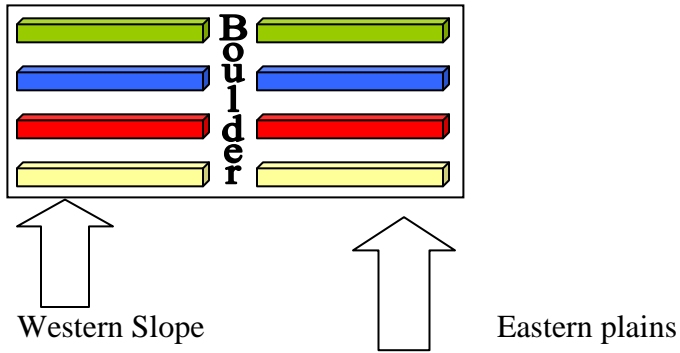
Cretaceous Seaways rocks 

Fountain Formation - Flatirons 

Precambrian rock 

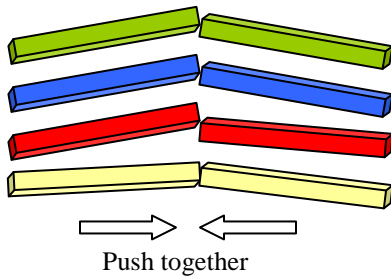
The red towel (Flatirons) will be the third towel down in the stack, near the bottom. Look at the diagram for an example.

Explain that the rectangle created by the two stacks represents Colorado, with eastern plains and western mountains separated by the gap. Boulder can be located at the gap, conveniently where the 'Flatirons' will emerge.

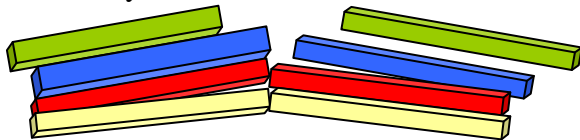


Explain to students that they will watch a demonstration of what happens when uplift occurs. \*Remind them that, in contrast to the demo, uplift takes place on a scale of millions of years, it's not something that one could observe.

Slowly push the two stacks together, and watch the mountains rise:

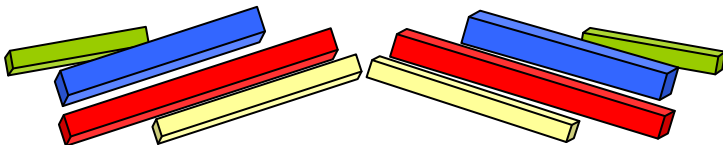


Peel away the top towel, explaining that over time, rocks are eroding and being washed far away from where the red towel will emerge.



Peel back (erode) the Cretaceous Seaway towel, \*keeping in mind that this is the Dakota Ridge, and should stay close to our mountains. Leave it slanted up against the 'mountains'.

Can you see the Flatirons forming yet? If not, erode some more! Keep in mind that the uppermost part of the Flatirons was also eroded away, which results in their 'stand-up' appearance.



Folding back the red towels a little bit causes them to stand more on end, leaning on the 'mountains' created by the other towels.

Towels are stored in a plastic container marked *Forming the Flatirons*.

Smaller towels are also stored in the container. These towels may be used to allow students to build the sedimentary layers and erode them away to show the Flatirons.

When discussing the sedimentary layers illustrations in the paperback *Ancient Denvers* help students visualize Colorado landscape at the time these layers were deposited. Poster size illustrations are available at Walden.