

**Watch the next few slides.  
When the slides stop  
transitioning get with an  
elbow partner to discuss the  
events that caused the  
formation of the beautiful  
features. Be as specific as  
possible.**





















A photograph of a vast desert landscape featuring rolling sand dunes. The dunes are illuminated by warm, golden light, likely from a low sun, creating deep shadows and bright highlights on the sand. The sky is a clear, deep blue. In the foreground, the texture of the sand is visible, showing fine ripples and patterns. A white, rounded rectangular box is overlaid on the lower portion of the image, containing text.

**Discuss with an elbow partner and be ready to share.**

# **Essential Question: How do changes in the Earth's surface occur over time?**

**Standard:**

**S6E5f. Explain the effects of physical processes (plate tectonics, erosion, deposition, volcanic eruption, gravity) on geological features including oceans (composition, currents and tides).**

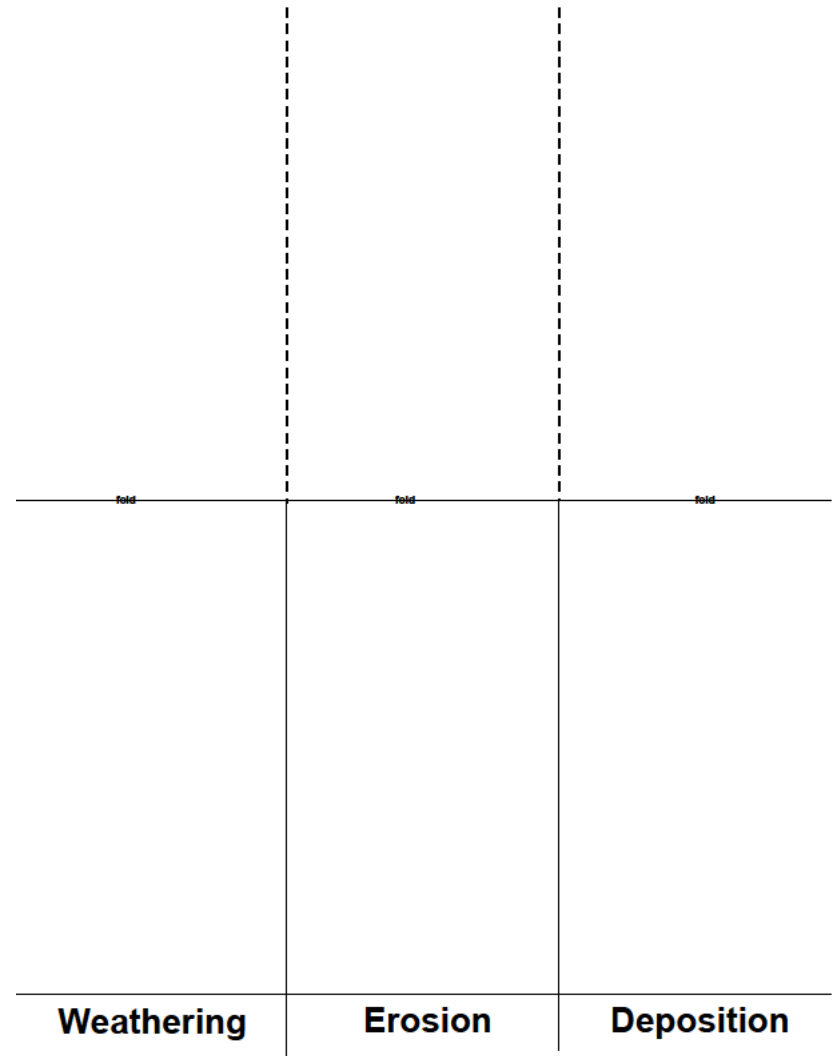


**In the previous lesson you learned about processes that can change rocks.**

**Now we are going to examine processes that change the surface of the Earth.**



Use your  
foldable to  
take Notes



# WEATHERING

A large, reddish-brown rock formation with a natural archway, set against a clear blue sky and a landscape of mountains with snow-capped peaks in the distance.

process that breaks down  
rock and other substances at  
Earth's surface.



**Weathering wears mountains down to hills and can produce strange rock formations like in the previous slide.**



**There are two types  
of weathering:**

- **Mechanical (Physical)  
Weathering**
- **Chemical Weathering**

# Mechanical Weathering

- **Rocks are broken apart by physical processes (heat, water, ice, pressure, temperature, etc.)**
- **Rock just changes size, not chemical make-up.**



**Example of  
Mechanical  
Weathering:**

**Ice  
Wedging**

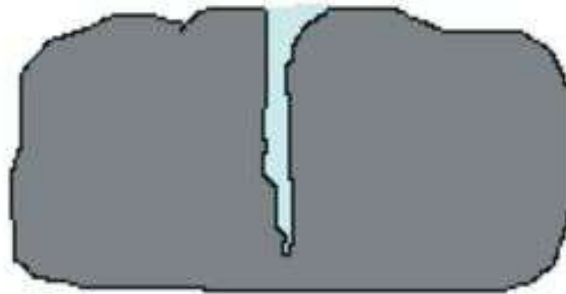




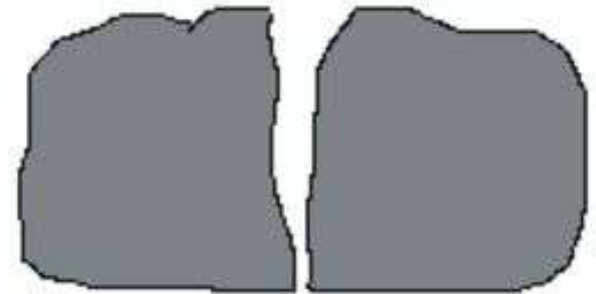
# Mechanical Weathering: Ice Wedging



Water seeps into cracks and fractures in rock.



When the water freezes, it expands about 9% in volume, which wedges apart the rock.



With repeated freeze/thaw cycles, rock breaks into pieces.

[Weathering and erosion - Freeze thaw weathering \[1:20\]](#)

[http://www.harcourtschool.com/activity/science\\_up\\_close/307/deploy/interface.html](http://www.harcourtschool.com/activity/science_up_close/307/deploy/interface.html)





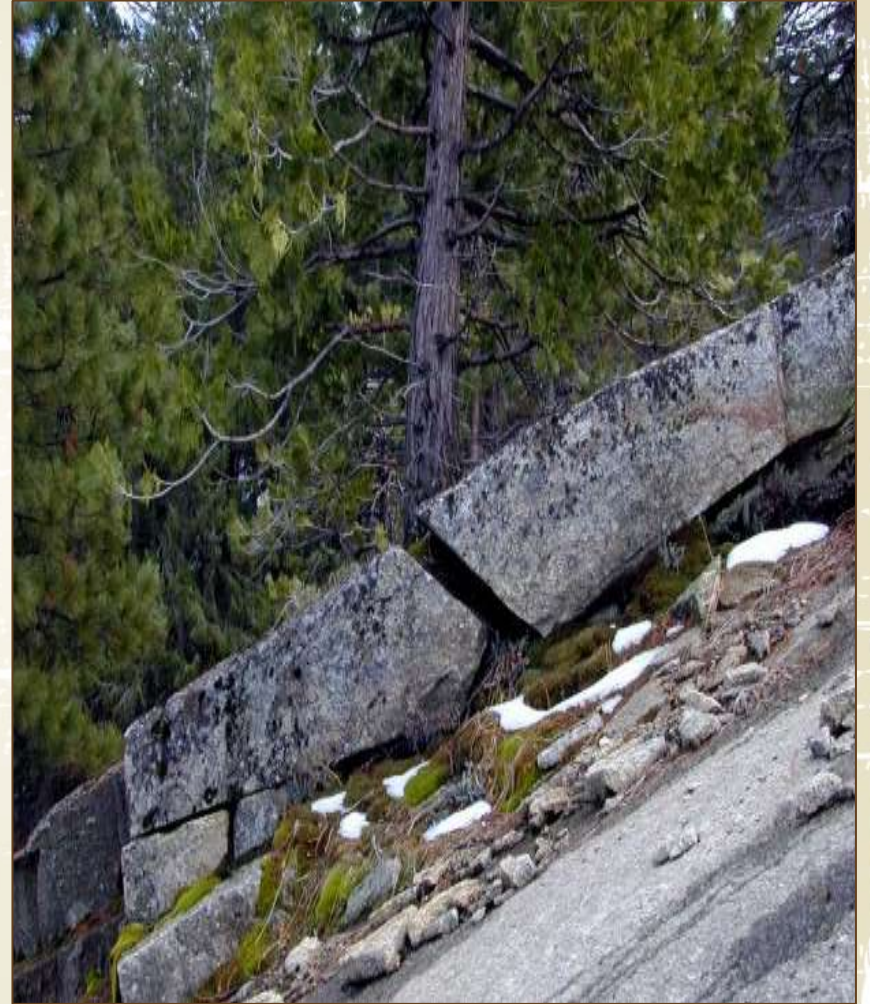
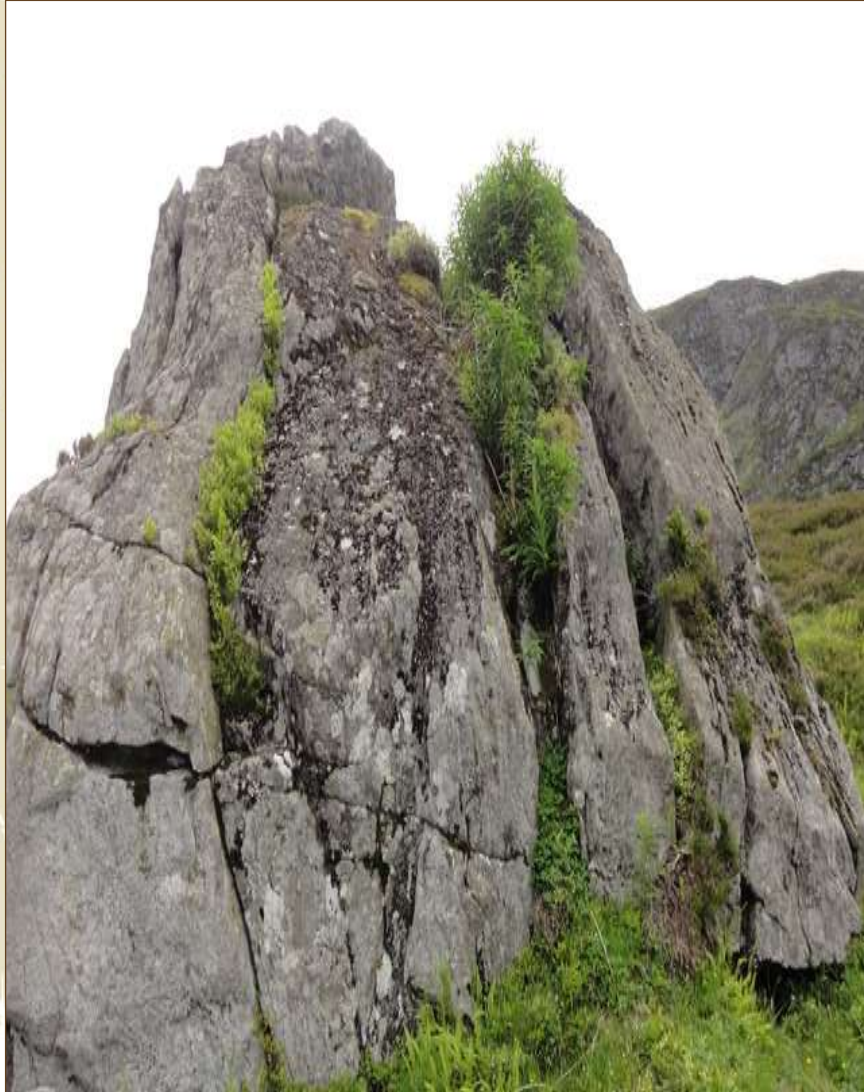


**Example of  
Mechanical  
Weathering:**

**Root  
Action**





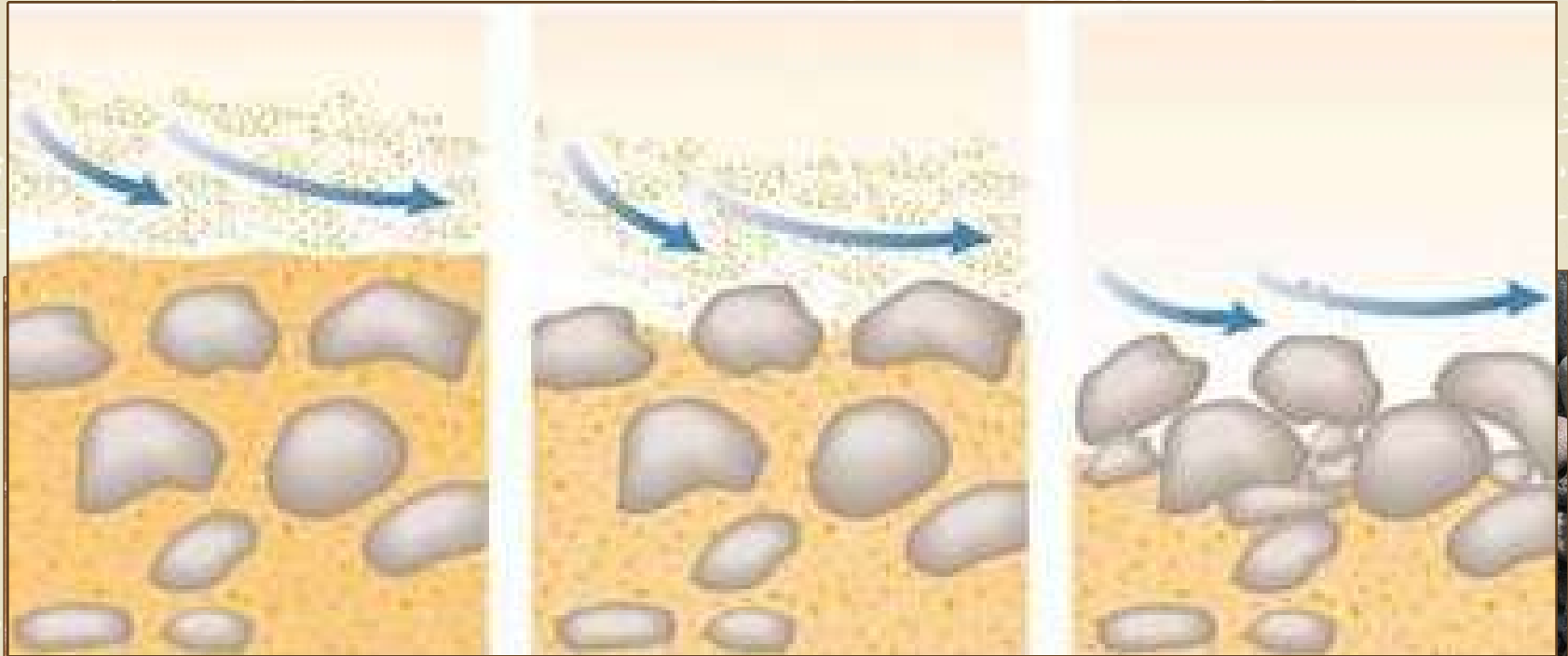




**Burrowing animals also cause mechanical weathering. They loosen sediment and push it to the surface as they burrow (dig).**



# Abrasion



**Sand rubbing  
against the rock**

**Rocks and other  
sediment rubbing  
against one another**



# Chemical Weathering

**Chemical reactions dissolve or change the minerals in rocks or change them into different minerals.**

# Example of Chemical Weathering:

Rocks and minerals can dissolve in **acidic waters**.











# Acid

**Rain**(debatable) causes the copper to turn into copper oxide, copper sulfate, copper hydroxide or copper chloride because of the oxidation-reduction reaction and this is basically copper salts or in other words, tarnish

# Example of Chemical Weathering:

[Chemical Weathering Feldspar into Clay](#) [28 sec]

[Animation of Chemical Weathering](#)

# **Example of Chemical Weathering:**

**When minerals containing iron are exposed to water and oxygen in the air, the iron reacts to form a new material that looks like rust [Oxidation].**



**Due to oxidation, iron-containing minerals like magnetite can weather to form a rust-like material called limonite.**



**Magnetite**



**Limonite**

**Turn to an elbow partner and discuss how making, baking, and eating chocolate chip cookies is similar to mechanical and chemical weathering.**

**Mechanical and Chemical Weathering: Breaking or Baking?**

**[2:50]**



# **Weathering Activities**

**[see resources]**

# Erosion

---



© CIARAN McCRICKARD/CONNORS



**Erosion transports**  
**weathered rock**  
**material.**

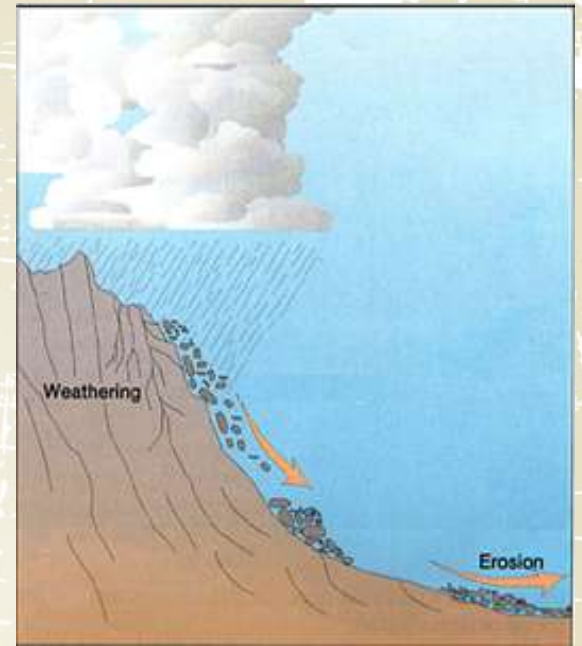


**What are some ways that weathered material can be transported?**



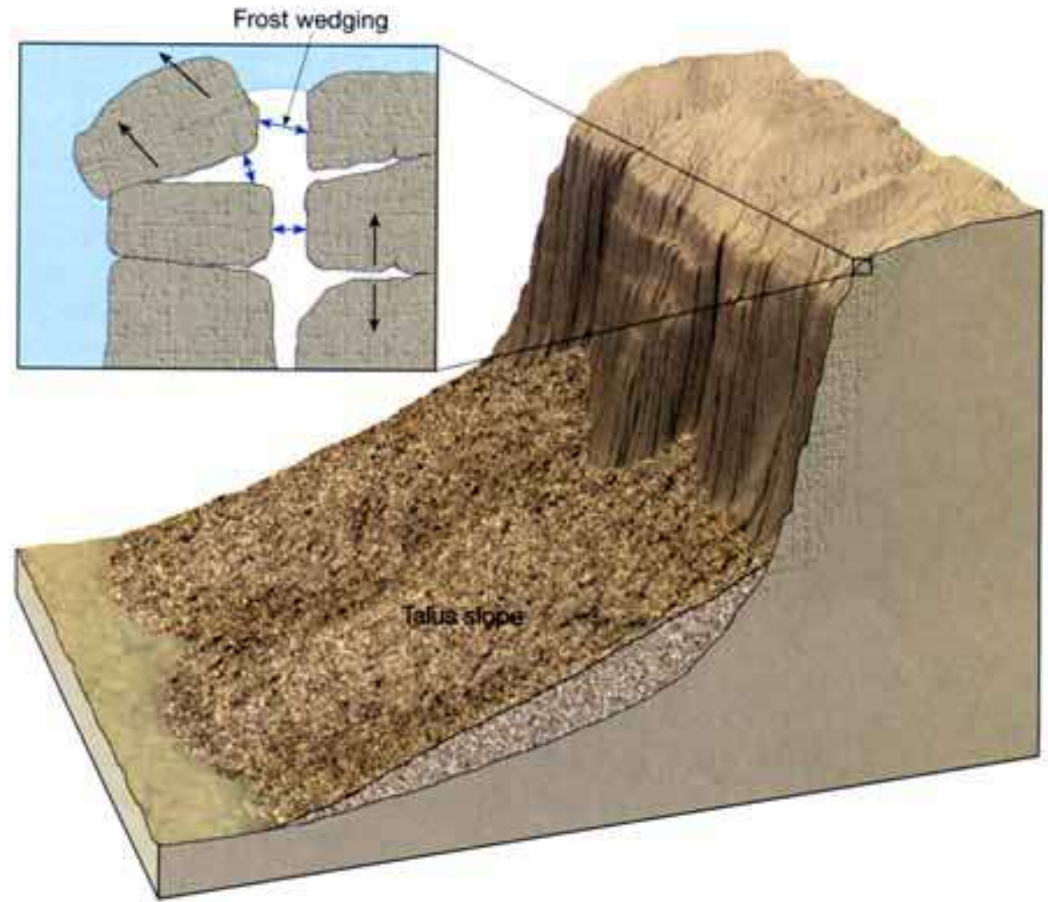


# Erosion by Gravity



**Rocks and other materials, especially on steep slopes, are pulled toward the center of Earth by gravity.**

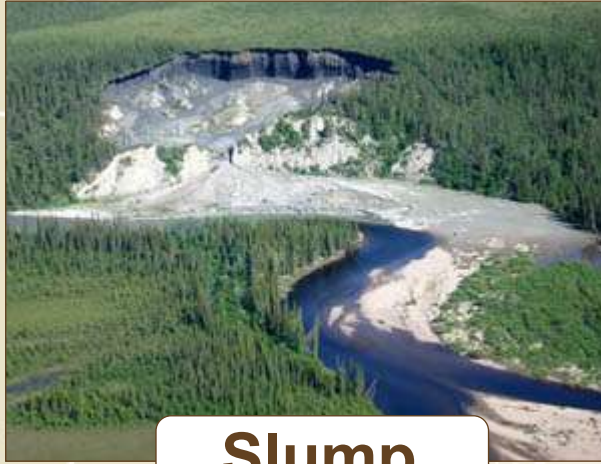
**Here, the weathering occurs by frost wedging**



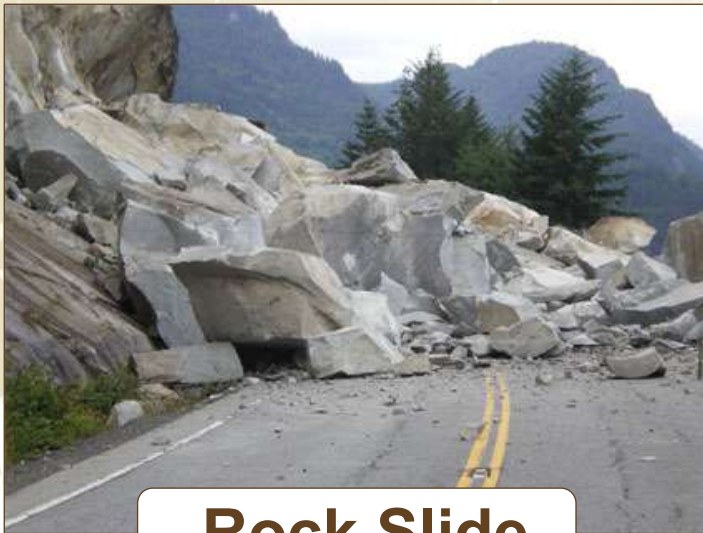
**The erosion occurs by gravity**



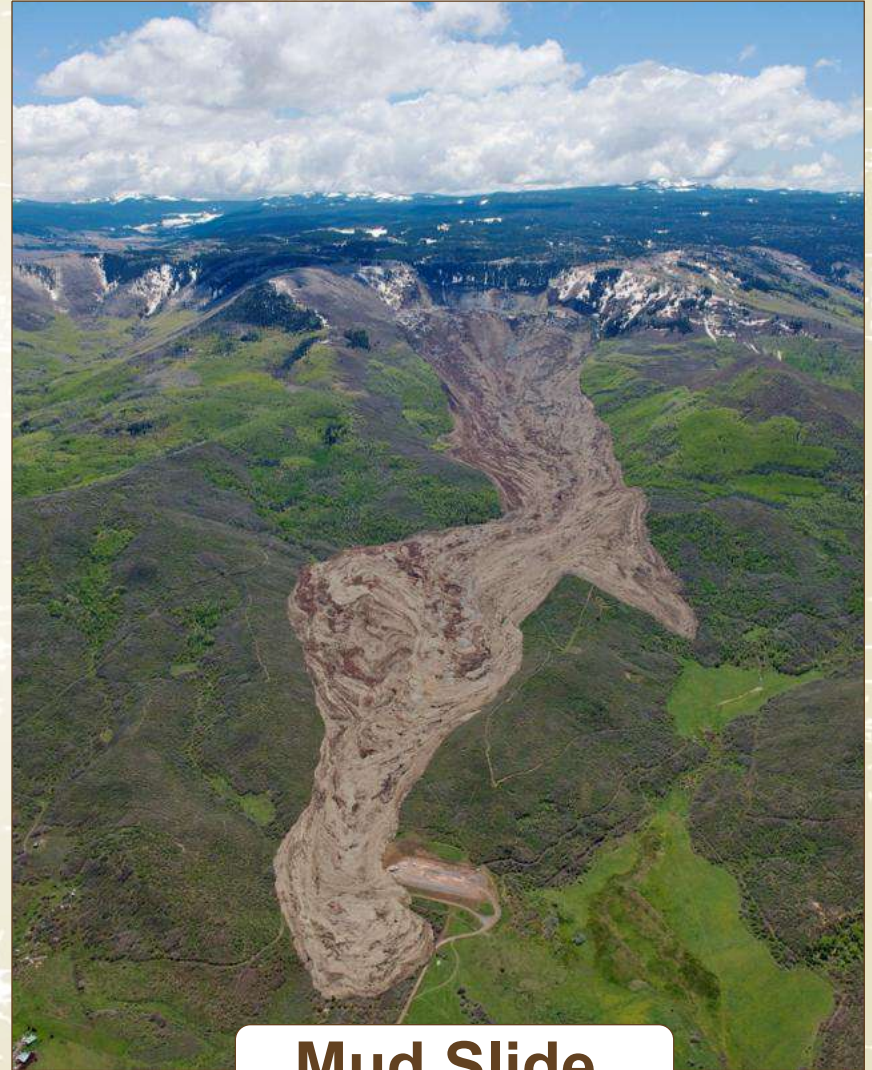
# Erosion by Gravity



**Slump**

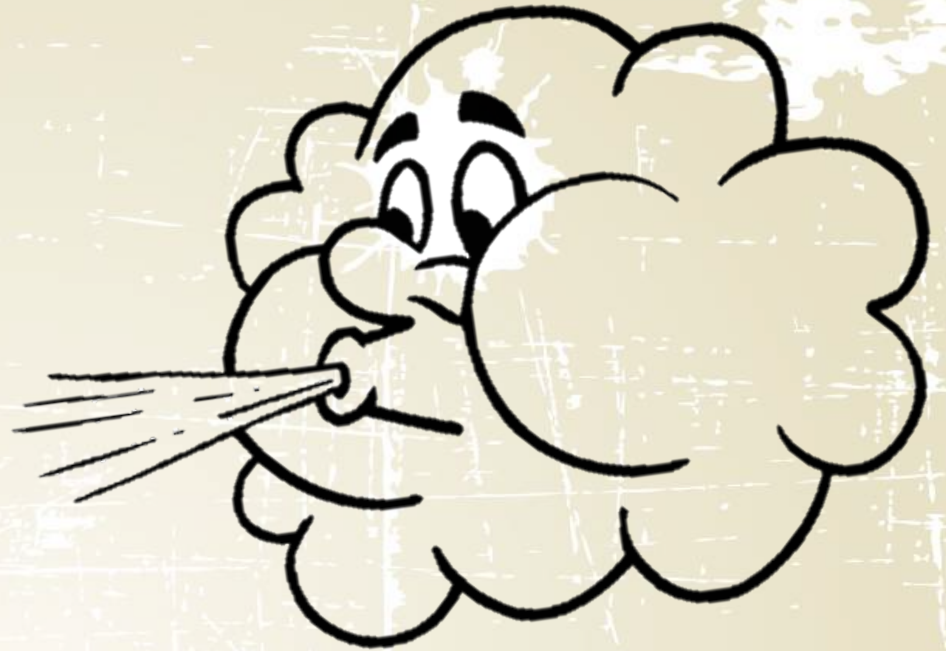


**Rock Slide**



**Mud Slide**

# Erosion by Wind



**When air moves, it picks up loose material and transports it to other places.**



# Erosion by Wind



**Sandstorm**



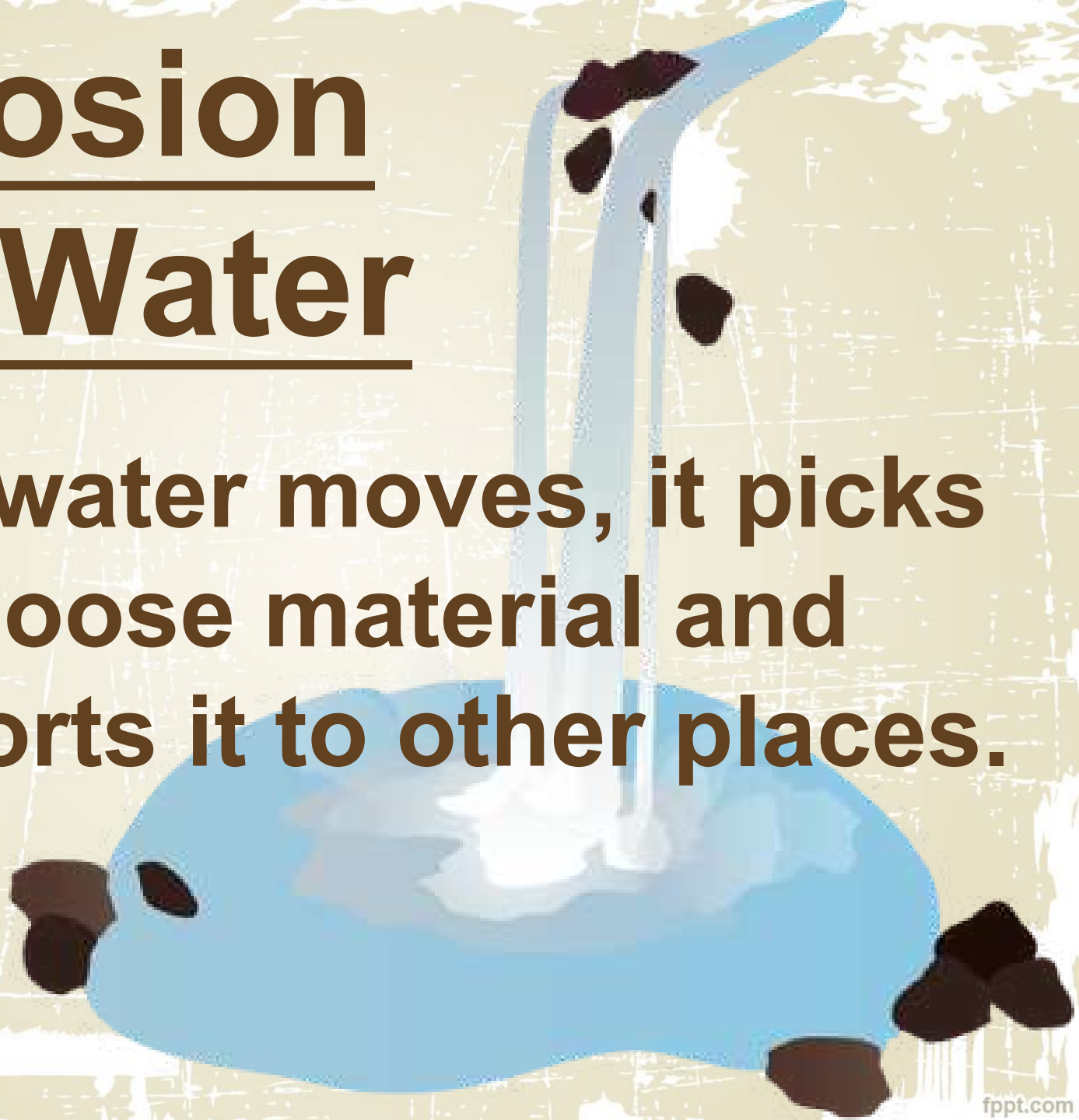
**Dust Storm**



**Strong Winds**

# Erosion by Water

**When water moves, it picks up loose material and transports it to other places.**





# Erosion by Water

**Rivers or Streams**



**Rain**



**Runoff**



**Flooding**





# Erosion by Water

## Waves eroding the shoreline



Images of Wave Erosion



# Animations of Erosion by Water

- Animation of sediments being transported
- Animation of erosion by a waterfall
- Animation of the formation of an arch



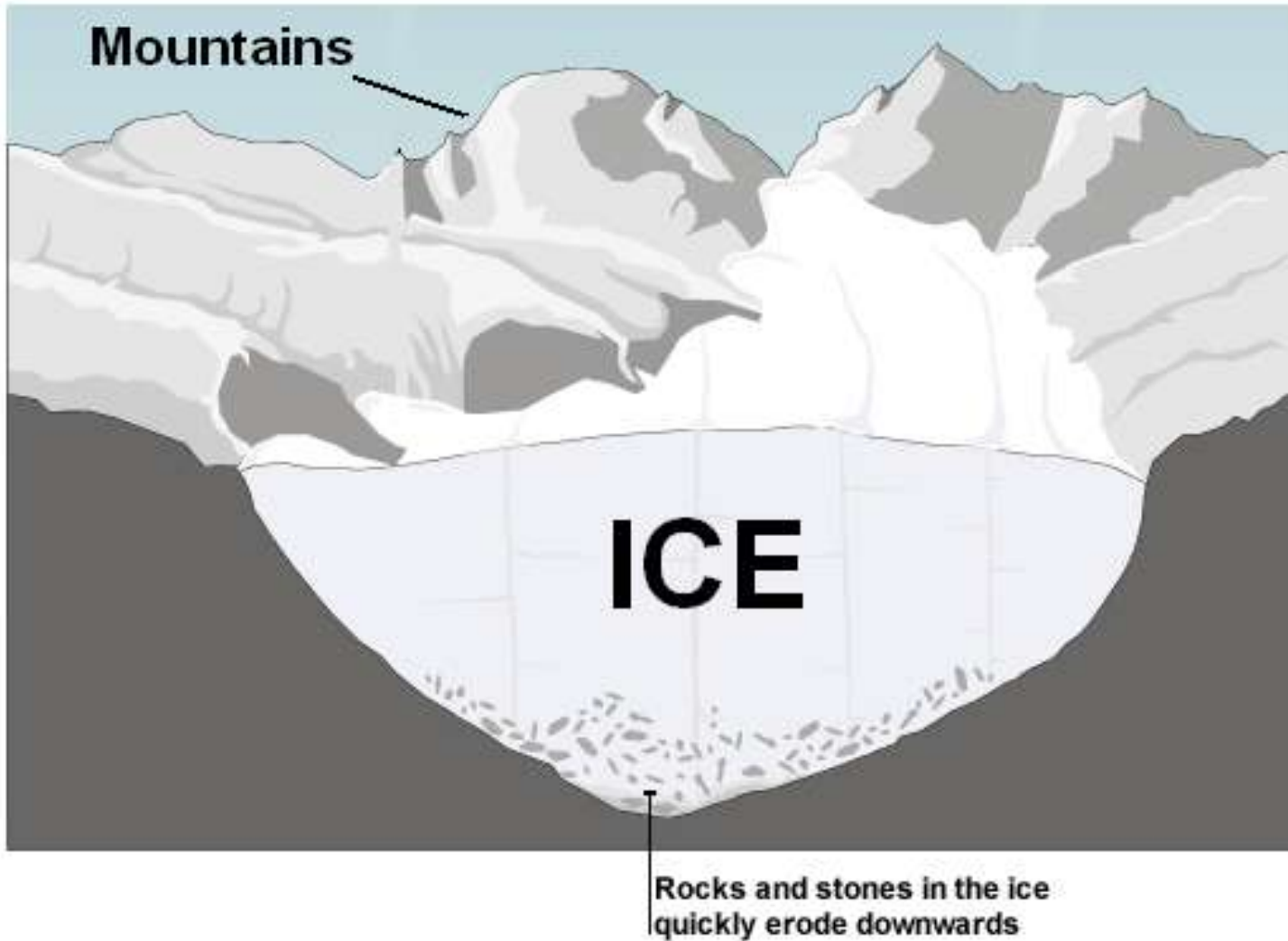
A large glacier is shown flowing through a narrow, rocky channel. The glacier is a mix of white and light blue ice, with visible crevasses and a rough, textured surface. The surrounding rock walls are dark and layered, showing signs of erosion. The overall scene is a dramatic landscape of glacial erosion.

# Erosion by Ice

**When a glacier moves, it picks up loose material and transports it to other places.**



# Erosion by Ice



Images of how Glaciers erode rock

**Turn to an elbow partner  
and describe examples of  
erosion you have observed.**

**With a different elbow  
partner, discuss the  
difference between  
Weathering and Erosion.**



**Weathering and Erosion are two very different processes that tend to act sequentially.**

