## Constructive & Destructive Forces on Landforms 5-3.1

S5E1: Students will identify surface features of the Earth caused by constructive and destructive processes.

- a. Identify surface features caused by constructive processes.
  - Deposition (deltas, sand dunes, etc.)
  - Earthquakes
  - Volcanoes
  - Faults

b. Identify and find examples of surface features caused by destructive processes.

- Erosion (water –rivers and oceans, wind)
- Weathering
- Impact of organisms
- Earthquake
- Volcano

c. Relate the role of technology and human intervention in the control of constructive and destructive processes.

seismological studies,

flood control, (dams, levees, storm drain management, etc.) beach reclamation (Georgia coastal islands)

## **Enduring Understandings**

- Students will understand that:
- Earth's surface features and constantly changing.
- Processes that shape the earth can be constructive, destructive or a combination of both.
- Human interaction with the earth can affect its surface features.



 $\rightarrow$ 2 landforms in Georgia that were caused by constructive forces,

 $\rightarrow$ 2 landforms in Georgia that were caused by destructive forces, and

 $\rightarrow$ 1 landform or process that involves both constructive and destructive forces.

## Two Types of Forces

- Destructive Forces: processes that destroy landforms.
  - 2 types: Slow (weathering) and Fast (Erosion)
  - Ex. landslides, volcanic eruptions, earthquakes, floods
- Constructive forces: forces that build up an existing landform or create a new one.
  - Caused by: water, gravity, wind and glaciers.
  - Ex: deposition, landslides, volcanic eruptions, floods

## Weathering

Weathering Pictures

Weathering: a slow, destructive force that breaks rocks into smaller pieces called sediments. Can by physical (mechanical) or chemical. Keywords: wear down, break apart

Mechanical weathering: the breaking of rock into smaller pieces by forces due to gravity, ice, plant roots, or other physical forces.







# Chemical Weathering: the changing of materials in a rock by chemical processes.





## **Erosion**

Erosion: the destructive movement of materials away from one place by wind, water, ice and gravity.

Wave Erosion- caused by water



#### Wind Erosion (Dust Storm)



## Landslides

Landslides: occur when gravity quickly pulls rock and dirt downhill.





## Floods

Floods: a great flow of water over an area that is usually dry land.



## **Volcanic Eruptions**

- Volcano: an opening in the Earth's crust through which steam, lava and ashes erupt.
- Cause both destructive and constructive changes to landforms.



## Mount St. Helens

#### Mount St. Helens Video







Saint Helen's After

# Volcanoes can be constructive, but also destructive...





## Earthquakes

 Earthquakes: the shaking of Earth's surface caused by the release of energy along a fault.

San Andreas Fault, California



## Volcanoes & Earthquakes

#### Tectonic Plates, Volcanoes & Earthquakes



## **Erosion & Deposition**

Deposition: the placing of materials in a new place (constructive force).

### Ex. Sandbars



## Water Erosion & Deposition

River Delta-Deposits of sediment at the mouth of the Mississippi River creating new land called a delta.





# Wind Erosion & Deposition Sand Dunes- sand is moved by wind

#### **Desert Sand Dunes**

Ocean Sand Dunes





## Rill

Rill erosion is the removal of soil by concentrated water running through little streamlets.

http://milford.nserl.purdue.edu/weppdocs/o verview/rill.html



Scientists can predict volcanic eruptions and sometimes earthquakes.

## **PROPER CONCEPTIONS**

Scientists can use specialized equipment and technology to learn more about when volcanoes and earthquakes might occur, but scientists cannot make consistent and accurate predictions yet.

Changes to earth's surface only happen quickly.

## PROPER CONCEPTIONS Changes to the earth's surface can happen fast or slow.

Weathering and erosion are the same thing.

## **PROPER CONCEPTIONS**

Weathering and erosion are both processes that change the earth's surface, but weathering involves breaking down rock into sediment while erosion is more related to wearing down earth's surface by carrying sediment away.

## MISCONCEPTION Rocks are here to stay!

## **PROPER CONCEPTIONS**

Rocks, concrete, metal, etc. are all subject to weathering, earth's destructive forces, and the rock cycle.

## MISCONCEPTION Rocks are here to stay!

## **PROPER CONCEPTIONS**

Rocks, concrete, metal, etc. are all subject to weathering, earth's destructive forces, and the rock cycle.

Humans can control earth's constructive and destructive forces.

## **PROPER CONCEPTIONS**

Debatable –Humans can use technology, mechanical means, structures, etc. to help control earth's forces, but only temporarily –eventually these will also succumb to earth's forces.

## **MISCONCEPTION** Earth's forces can only destroy.

## **PROPER CONCEPTIONS**

Earth's forces can be constructive, destructive, or a combination of both.

According to standard S5E1, tornadoes, hurricanes, and blizzards, among others, are powerful forces that shape the earth.

## **PROPER CONCEPTIONS**

True to some extent, but standard S5E1's focus should be on constructive and destructive processes of the Earth and as related to earth's geology rather than on atmospheric processes.