Any Questions?

Hydrologic cycle
- How precipitation is apportioned between runoff into the ocean, evaporation and infiltration

Rainfall In Hawaii
- Much of the water that infiltrates into the ground remains there and becomes part of the groundwater system.
- Averages about 190 cm (75") per year for the island chain

Rainfall In Hawaii
- Not evenly distributed
- Some areas receive less than 25 cm (10")/yr
- Other areas receive more than 750 cm (~300") per year
- Rain Shadows

Rainfall In Hawaii
- More rain fall in windward Oahu than in leeward Oahu
- Kaho'olawe is in the rain shadow of Haleakala, so it receives very little rainfall

Rainfall In Hawaii
- Also not equally distributed during the year
- We have times with little or no rain and times with large amounts of rain that lead to flooding.
- A problem in Hawaii: The areas into which water drains (drainage basins) are very small (Compare to California)
Stream erosion and deposition
- Streams are the main agents of erosion of the landscape in Hawaii
- Rain water runs off the mountains toward the ocean
- Water runs down the steepest slope it can find

The speed of the water flow is determined by the steepness of the slope (Gradient)
The steeper the gradient, the faster the water flows

As water flows, it picks up any loose debris
- The size of the objects that can be moved depends on the speed of flow

The volume of material being moved by a stream is called the load
- (Depends on both volume of water in the stream and the velocity of the stream)
- Maximum load of a stream is its capacity

Largest size of fragment that can be moved is called stream’s competence
- For any given size of particle, there is a minimum stream velocity that must be achieved to move it

As a stream moves downstream, it erodes its banks and bottom
- Can get deeply eroded, v-shaped stream valley
Stream erosion and deposition

- When streams flow long distances, can get meanders
- Not many meandering streams in Hawaii

Geomorphic cycle

- An area being cut into hills and valleys by stream erosion goes through a series of stages that are fairly similar around the world
- Divided into stages known as:
  - Youth
  - Maturity
  - Old age

Geomorphic cycle

- New shield volcanoes have gullies cut in the youthful stage

Geomorphic cycle

- New shield volcanoes have gullies cut in the youthful stage
- These gullies develop into V-shaped valleys between broad areas of original surface that remain almost unchanged

Submature Stage

- Koolau and Waianae ranges are examples
- Valleys are still V-shaped, but the original surface of the shield has been destroyed
Mature Stage
- Valley floor is slowly widened
- Shape of valley changes from sharp V to a broader V with a flat floor
- Some parts of NE Kauai and windward Oahu are in this stage, but no island has yet reached maturity throughout

Old Age Stage
- Marked by reduction of mountains to rolling hills with broad flat-floored valleys between them
- Mountains are eroded almost to sea level
- Ocean finally finishes cutting a flat surface

Waterfalls
- Occur when a more resistant bed overlies a less resistant bed
- Less resistant bed is easily eroded

Base Level
- Generally sea level
- But, can be changed artificially
- If its base level is changed, a stream will either flow faster (and erode more) or slower (and probably deposit some of its load)
Video
- 1988 New Year’s flood

Questions?

Next Time
- Finish reading Chapters 8 and 9

Big Island Field Trip
- Remember the meeting on Friday at 1:00 pm