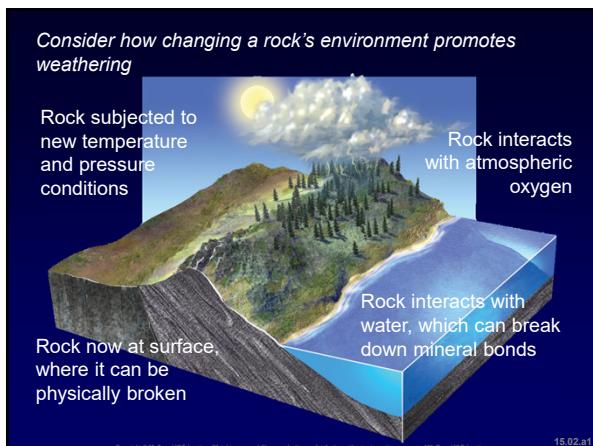
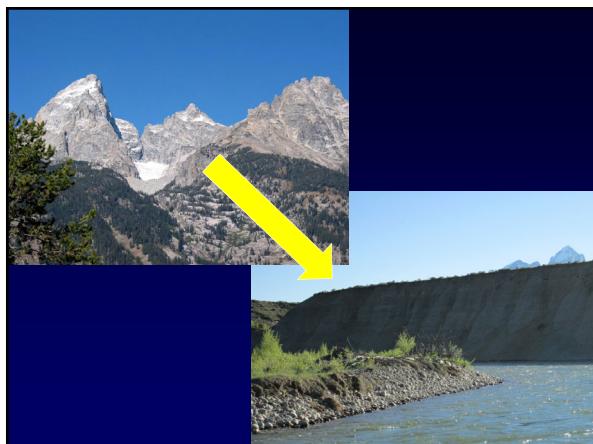
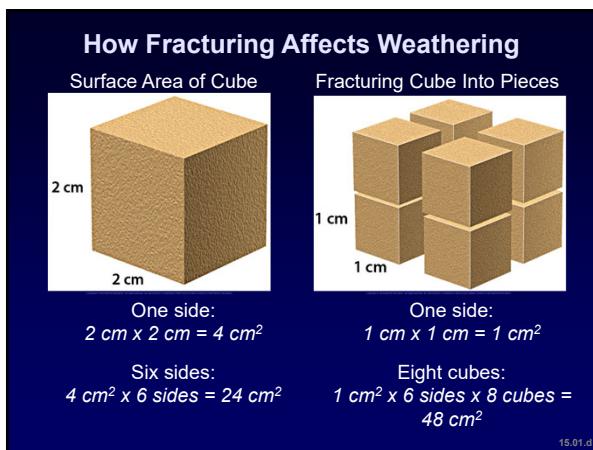
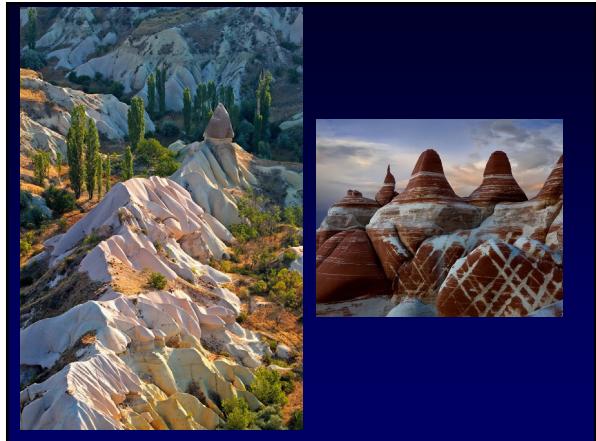
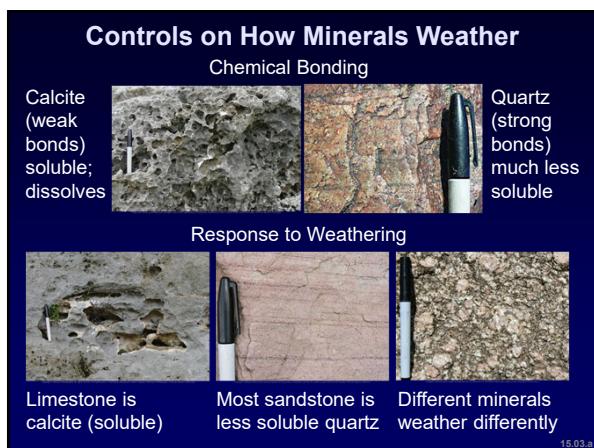
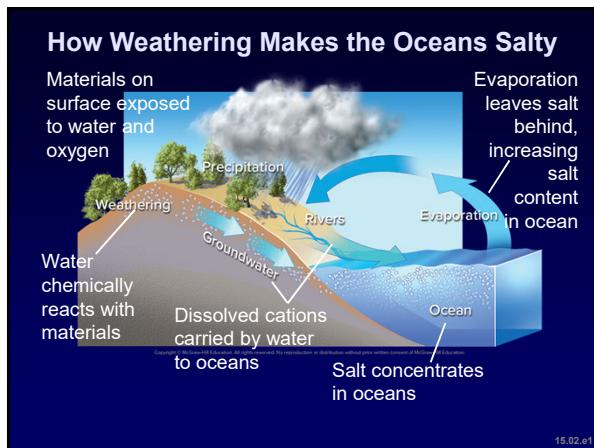


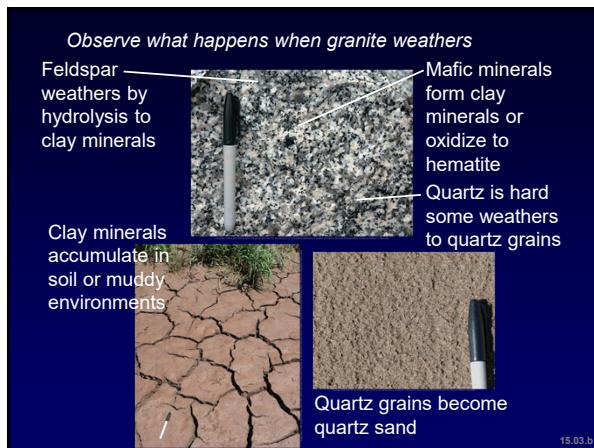


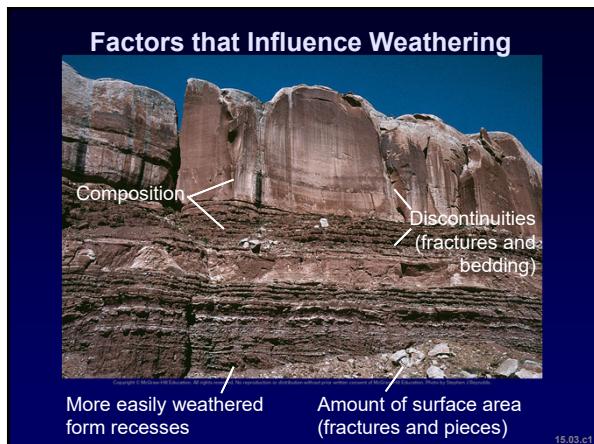
How Fracturing Affects Weathering

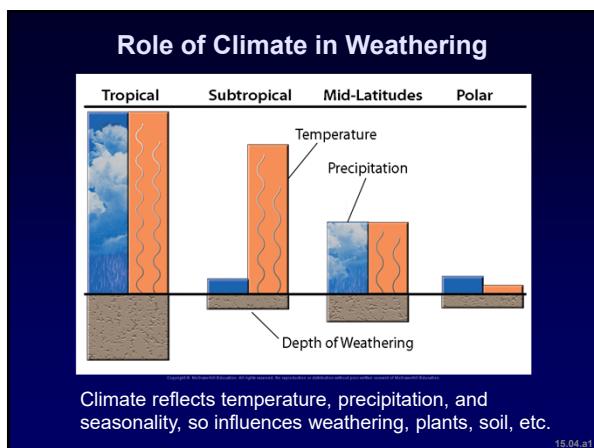












How Slope Influences Weathering

Which way a slope faces (slope aspect)

Sunny slopes have less soil, plants, and chemical weathering

Windward slopes receive more precipitation (orographic effect)

Gentle slopes retain soil and moisture and accumulate material from higher

Shaded slopes have more soil and plants

N

15.04.b1

Life and Time Influence Weathering



Biological activity causes weathering, such as root breaking apart rocks and plant-derived acids attacking materials in soil

Time is crucial factor in weathering. More time = more weathering

Observe how weathering produces rounded features

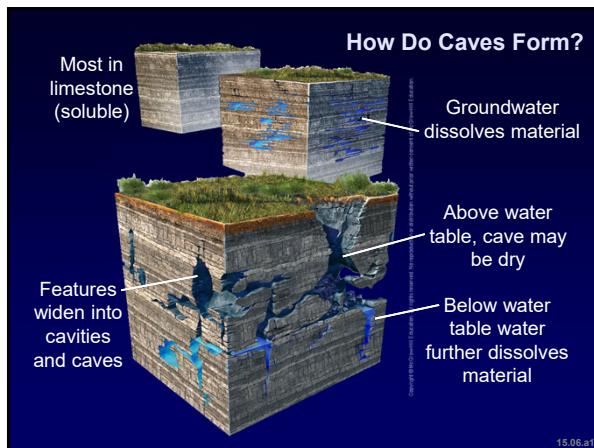
Many rocks have sharp angular edges

Edges and corners begin to smooth

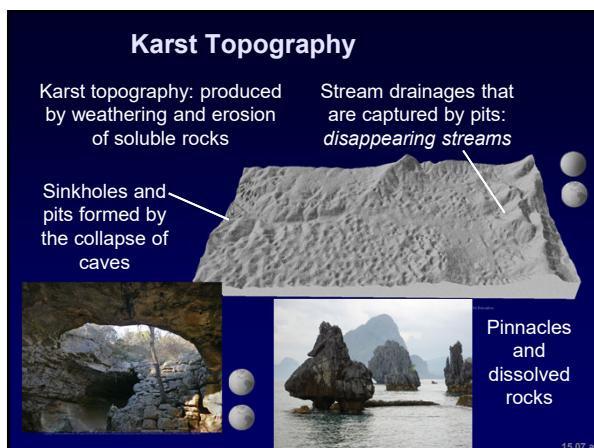
No sharp edges or angular features

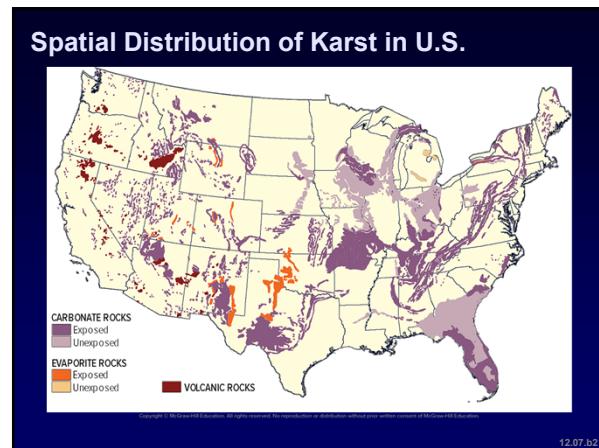
Weathering rind

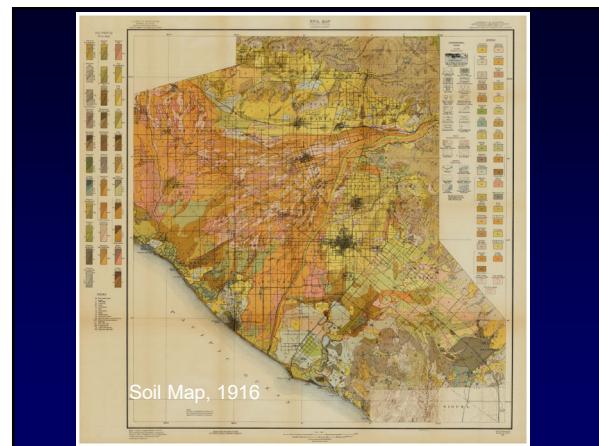
Spheroidal weathering















Observe this cut through a soil

Soil layers are *horizons* and assigned letters

O: Organic material
A: Organic material and mineral grains
E: Leached zone
B: Clay, iron oxides, calcite (in dry climates)
C: Weathered bedrock
Bedrock

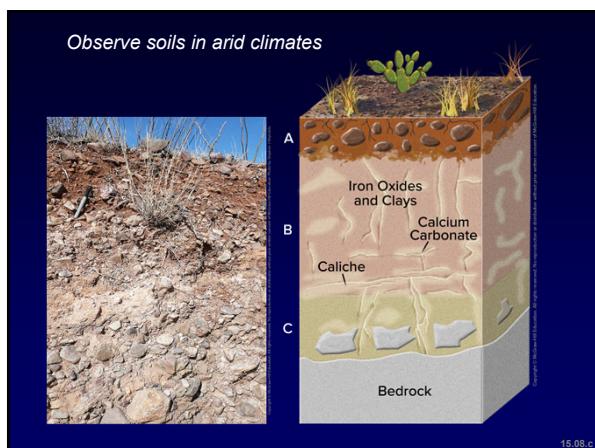
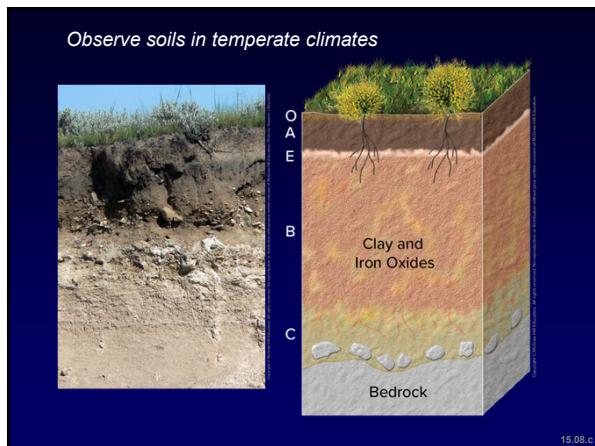
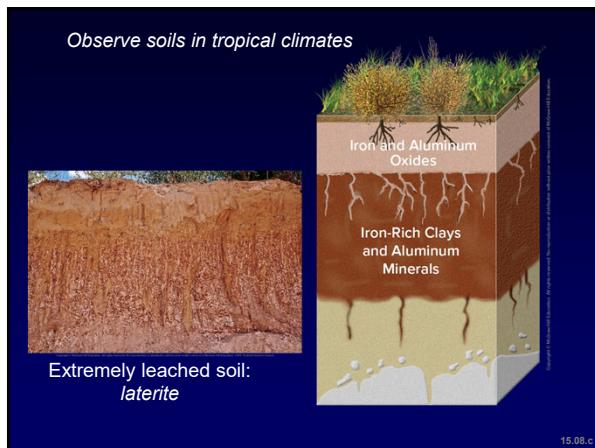
Not all soil horizons are present in every soil: depends on climate and whether top eroded away

15.08.a

Processes of Soil Formation

Where Material Comes From	How Material Moves
Water, organic matter, and sediment from surface	Ions leached from upper part
Gas from roots	Clay and fine particles work downward
Weathering weakens underlying bedrock	Calcite accumulates (in dry climates)

15.08.b1



Activities that Threaten Soil



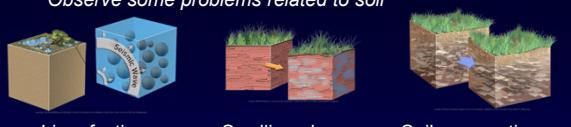
Overgrazing Erosion

Removing vegetation Soil contamination

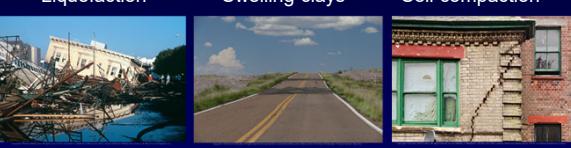
15.09.b



Observe some problems related to soil



Liquefaction Swelling clays Soil compaction



Liquefaction during an earthquake Road destroyed by swelling clays Cracks caused by compaction

15.09.c

Role of Gravity in Slope Stability

Gravity acts vertically so block will not move on a flat surface

Gravity pulls block at an angle so block can move on an angled slope

Normal component pushes the block against the slope

Shear component pushes block down slope

15.10.a1

Consider how steep a slope can be and remain stable

Dry Sand

Angle of Repose

15.10.b

Sand dune

Angle of repose for dry sand

Talus slope

Scoria cone

Coarse material can have a steeper angle of repose

15.10.c

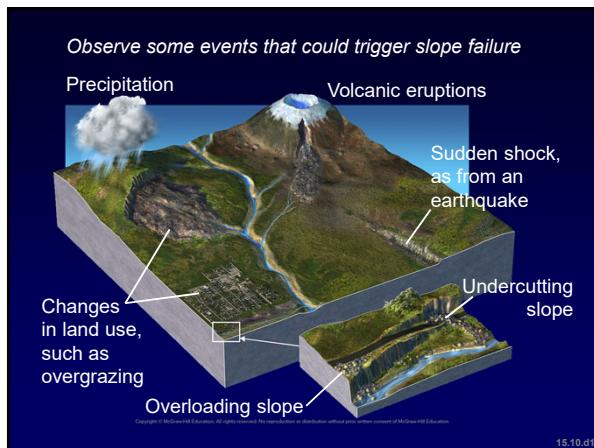
Factors that Control Slope Stability

Angle of repose for material

Amount of water

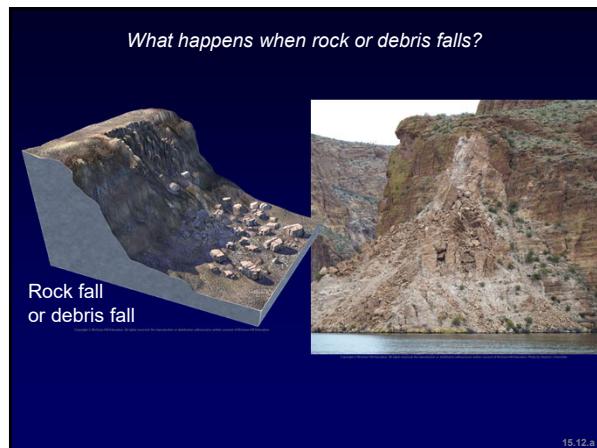
Discontinuities: fractures, cleavage and bedding

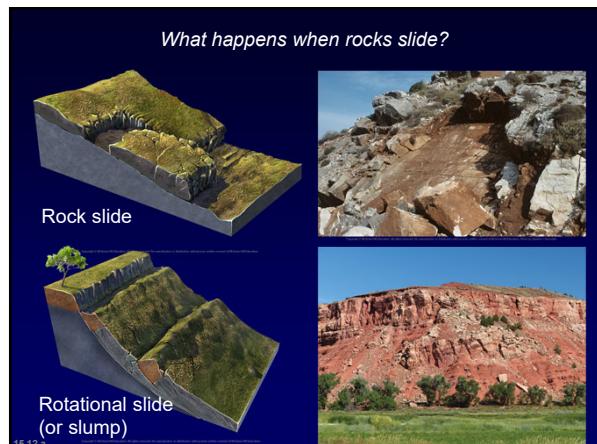
15.10.c

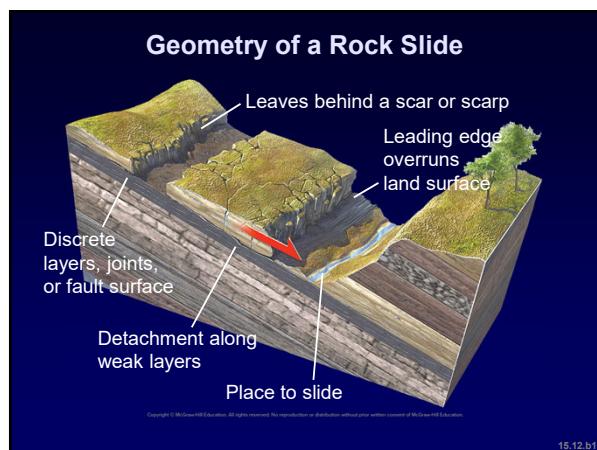


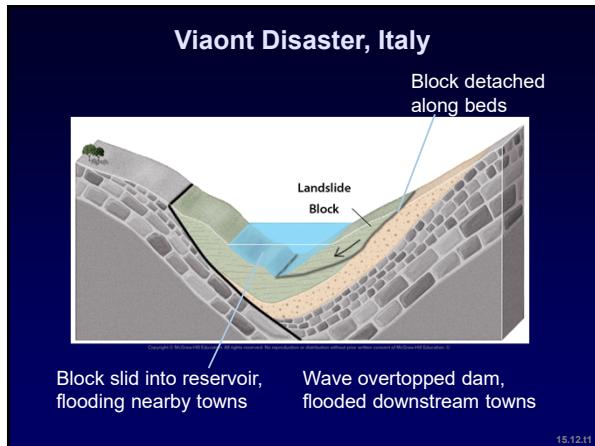


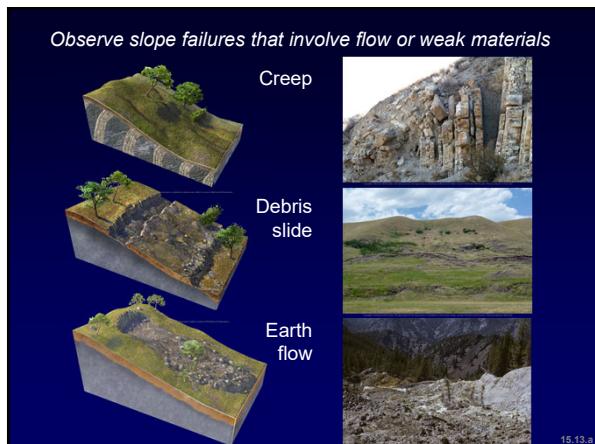










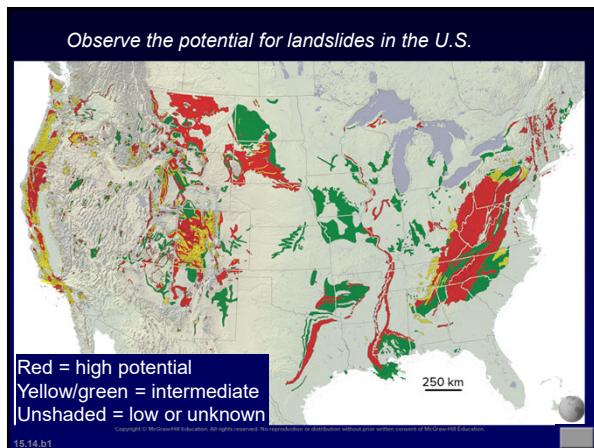


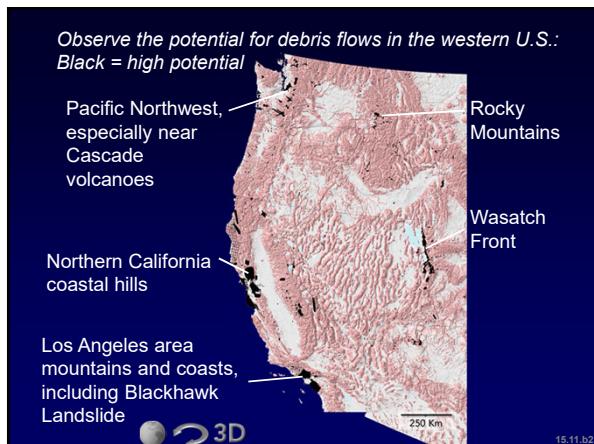


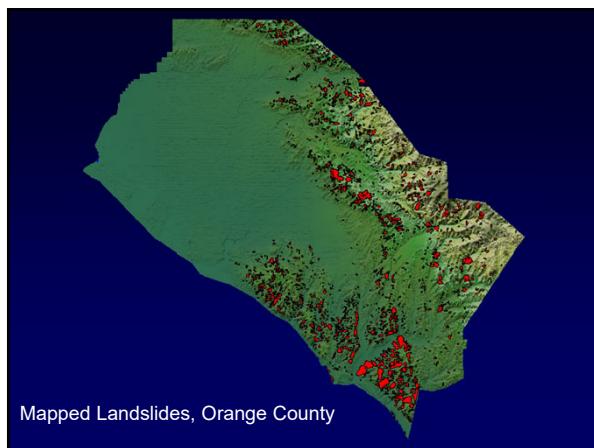












Recognizing Prehistoric Slope Failures



Assessing Potential for Slope Failure







