History of Historical Geology
Uniformitarianism vs. Catastrophism; Neptunism vs. Plutonism
Actualism
Discovery of Geologic Time

Rock Cycles
Major classes of rocks, how they form, and the bases for their classifications:
Igneous: volcanic/extrusive/aphanitic vs plutonic/intrusive/phaneritic; ultramafic → mafic → intermediate → felsic
Metamorphic: regional vs. contact; metamorphic grade & metamorphic facies (concepts – not definitions or examples)!
Sedimentary: detrital (= clastic = siliciclastic), biogenic, chemical; strata
Detrital Sedimentary Cycle: Source → Weathering → Transport (Rounding/Sorting) → Deposition → Lithification
Sedimentary Structures: mudcracks, raindrop marks, ripples & crossbeds (wave, current, trough)

Sedimentary Environments
Know the types of lithologies & structures produced by:
Nonmarine: Paleosol, Lacustrine, Paludal, Glacial, Desert, Fluvial
Coastal: Deltaic, Barrier Island-Lagoon, Sabkha
Marine: Reefal, Carbonate Bank, Siliciclastic Shelf, Turbidites, Oozes
Facies concept
Transgressions (onlap sequences) & Regressions (offlap sequences)
Sources of coastline changes: progradation, tectonic, eustatic, isostatic
Walther’s Law

Geologic Time
Relative vs. numerical (“absolute”) time
Principles of Stratigraphy: Original Horizontality, Superposition, Lateral Continuity, Cross-Cutting Relationships,
Inclusions, Fossil Succession
Geopetal indicators
Unconformities: Disconformities, Angular Unconformities, Nonconformities
Radiometric dating: standard method, isochron method, radiocarbon, fission track
Other methods: transgression-regression, eustatic sea level changes, marker beds, stable isotope,
magnetostratigraphy, astrochronology

Lithostratigraphy
Supergroup
Group
Formation
Member
Bed
Lithostratigraphic Grammar: Morrison Formation, Karoo Supergroup, Keyser Limestone, etc.
Intertonguing
Isochrony vs. diachrony

Biostratigraphy
Index fossils: properties & uses; First Appearance Datum & Last Appearance Datum; Zone

Other Methods of Stratigraphy
Magnetostratigraphy (Chron); Sequence Stratigraphy (Sequence)
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<thead>
<tr>
<th>Geologic Column</th>
<th>Chronostratigraphy (Rock)</th>
<th>Geochronology (Time)</th>
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Geologic Column Grammar: e.g., Jurassic System (rock) vs. Jurassic Period (time), Upper Jurassic Series (rock) vs. Late Jurassic Epoch (time)

GSSPs and GSSAs