



SEQUENTIAL TIMELINE OF ROCK FORMATION



Evolution of Earth's Crust, Sediments, and Rock Types

Time	Earth History	Dominant Rock Formation
PRECAMBRIAN		
4.54–4.40 Ga*	Earth forms	🌋 First igneous rocks crystallize from global magma ocean
4.40–4.00 Ga	Earliest crust develops	🪨 Basalts and primitive granitic crust form
4.00–2.50 Ga	First continents grow	🏔️ Granite-greenstone belts; oldest surviving metamorphic rocks; banded iron formations begin
3.80–2.00 Ga	Early oceans and life	🌊 Major sedimentary rocks appear; cherts, shales, and banded iron formations accumulate
2.50–1.60 Ga	Oxygenation of Earth	🌀 Vast banded iron formations deposited as dissolved iron precipitates
1.80–1.00 Ga	Stable continents expand	🏔️ Large granite batholiths and metamorphic mountain belts develop
1.00–0.54 Ga	Rodinia and Snowball Earth	❄️ Extensive glacial deposits; thick sedimentary basins
PALEOZOIC		
541–252 Ma (Cambrian)	Explosion of marine life	🐚 Limestone, sandstone, shale, and reef deposits become widespread
359–299 Ma (Carboniferous)	Vast forests	🌳 Coal deposits form from buried swamp vegetation
MESOZOIC		
252–66 Ma	Dinosaurs; breakup of Pangaea	🌋 Flood basalts, marine limestones, desert sandstones
CENOZOIC		
66–2.58 Ma	Modern mountain building	🏔️ Thick sedimentary basins, volcanic rocks, uplifted metamorphic cores
2.58 Ma–Present	Ice Ages and humans	❄️ Glacial deposits, river sediments, volcanic ash, modern soils

Major Rock Types Through Time

Rock Type	First Major Appearance	Formation Process
🌋 Igneous Rocks	4.54 Ga	Cooling magma and lava
🏔️ Metamorphic Rocks	>4.0 Ga	Heat and pressure alter existing rocks
🌊 Sedimentary Rocks	~3.8 Ga	Deposition of sediments in water
🌀 Banded Iron Formation	3.8–1.8 Ga	Iron precipitated from ancient oceans
🐚 Limestone	Abundant after 541 Ma	Marine organisms build carbonate shells
🌳 Coal	Peak 359–299 Ma	Burial of swamp forests
🏖️ Sandstone	Throughout history	Cemented sand deposits
❄️ Glacial Deposits	Especially 720–635 Ma and recent Ice Ages	Deposited by glaciers

*NOTE: Ga = Billion Years ago Ma = Million years ago ka – Thousand years ago