

# GEOLOGIC TIME IN PENNSYLVANIA

Our planet's history is grouped into geologic divisions that are based on the evolution of plants and animals as witnessed in our rocks. The longest stretches of time are eons, and these get subdivided (from longest to shortest) into eras, periods, epochs, and stages. The chart below indicates characteristics of geologic time intervals as they relate to Pennsylvania. Ages are based on the International Chronostratigraphic Chart of 2014, which is online at [www.stratigraphy.org/ICSchart/ChronostratChart2014-02.pdf](http://www.stratigraphy.org/ICSchart/ChronostratChart2014-02.pdf).

AGE (in millions of years)	EON or ERA		PERIOD	DOMINANT GEOLOGIC ACTIVITY	NOTABLE ROCK TYPES OR DEPOSITS	NOTABLE LIFE-FORMS
2.6	CENOZOIC ERA "New Life"	Z O	<b>QUATERNARY</b> <b>Holocene and Pleistocene Epochs</b> The <b>Pleistocene</b> , or "Ice Age," started 2.6 million years ago. Glaciers entered northern parts of Pennsylvania during the following glacial subdivisions (from oldest to youngest): <b>pre-Illinoian</b> , <b>late Illinoian</b> , and <b>late Wisconsinan</b> . The <b>Holocene</b> came after the Pleistocene, starting 11,700 years ago. It is proposed that another epoch, the <b>Anthropocene</b> ("Age of Man"), has begun.	Glaciation; periglacial erosion and deposition; modification of landscape in northeastern and northwestern Pennsylvania, including formation of Lake Erie	Sand, silt, clay, gravel	Hominids (especially <i>Homo sapiens</i> ) and other mammals, grasses, flowering plants
66			<b>TERTIARY</b> "Tertiary Period" is the classic name used by the Pennsylvania Geological Survey in lieu of the two periods recognized by the International Commission on Stratigraphy—Paleogene (older) and Neogene (younger).	Weathering and erosion; creation of present landscape south of glaciated areas	Sand, silt, gravel	Primates (including first hominids) and grazing mammals, birds, flowering and deciduous plants, grasses
145	MESOZOIC ERA "Middle Life"	E C O	<b>CRETACEOUS</b> Many land and sea animals became extinct over an interval of approximately one million years at the end of the Cretaceous Period.	Erosion and weathering	Clay, sand	Dinosaurs, swimming and flying reptiles, mammals, birds, rays, sharks, ammonites, starfish, sea urchins, diatoms, leafy and flowering plants, bees
201			<b>JURASSIC</b>	Diabase intrusions; opening of Atlantic Ocean	Diabase	Dinosaurs, swimming (turtles and crocodiles) and flying reptiles, mammals, birds, ammonites, rudistid bivalves, conifers, cycads, ginkgo trees
252			<b>TRIASSIC</b>	Separation of Africa from North America; sedimentation in rift valley	Shale, sandstone, conglomerate, siltstone	Early dinosaurs, swimming and flying reptiles, early mammals and birds, conifers, cycads, seed plants
299	PALEOZOIC ERA "Old Life"	P E R M I A N	<b>PERMIAN</b>	<b>Alleghanian Orogeny:</b> Collision of Africa and North America creates Appalachian Mountains; thrust faulting and folding; much erosion	Sandstone, shale	Conifers, fungi, insects and other arthropods, amphibians, reptiles
323			<b>PENNSYLVANIAN</b>	Early period of erosion in central and western Pennsylvania; development of low, flat alluvial plain	Sandstone, shale, siltstone, conglomerate, coal, limestone	Tree and seed ferns, scouring rushes, early conifers, amphibians, insects, air-breathing snails, early reptiles, foraminiferans
359			<b>MISSISSIPPIAN</b>	Erosion of southeast highland; deltaic transitioning to alluvial deposition	Sandstone, siltstone, shale, conglomerate	Crinoids, foraminiferans, insects, bryozoans, brachiopods, amphibians, land plants
419			<b>DEVONIAN</b>	<b>Acadian Orogeny:</b> Collision of Avalonia, Europe, and North America; formation of Catskill Delta	Sandstone, siltstone, shale, conglomerate, limestone	Armored and lobe-finned fish, tetrapods, brachiopods, reef-building corals, ammonoid cephalopods, insects, early land plants
443			<b>SILURIAN</b>	Erosion of mountains; deposition of sand and mud	Sandstone, shale, quartzite, siltstone, limestone, conglomerate, gneiss	Crinoids, brachiopods, corals, reef-building stromatoporoids, jawed and jawless fish
485			<b>ORDOVICIAN</b> This period is included in the informal era subdivision <b>lower Paleozoic</b> .	<b>Taconic Orogeny:</b> Thrusting of volcanic arc; development of Appalachian basin	Limestone, dolomite, shale, sandstone, siltstone, chert, schist, gneiss, phyllite	Trilobites, graptolites, mollusks, bryozoans, conodonts, echinoderms, jawless fish
541			<b>CAMBRIAN</b> This period is included in the informal era subdivision <b>lower Paleozoic</b> .	Transgression of the sea; carbonate deposition	Limestone, dolomite, quartzite, sandstone, shale, schist, gneiss, marble, phyllite, serpentinite	Trilobites, brachiopods, hyoliths, bizarre "Burgess Shale"-type life-forms
2,500	PROTEROZOIC EON	All rocks and geologic time older than the Cambrian are commonly referred to as <b>Precambrian</b> .	Accretion of microplates to form Laurentia	Gneiss, serpentinite, metabasalt, metarhyolite, anorthosite, pegmatite	Cyanobacteria ("blue-green algae"), Ediacaran life-forms, jellyfish, worms	
4,000	ARCHEAN EON		Bombardment of Earth by comets and asteroids; creation of continental crust	None identified in Pennsylvania	Bacteria	
4,600	HADEAN EON		Formation of Earth and solar system	None identified in Pennsylvania	None identified	