

Stratigraphic Units That Can Be Seen From Ft. Niobrara (Lecture Notes/Note-taking Key)

Formation Name	How long ago	Name of Time	Description	Depositional Environment	Climate	Fossils
Sand Hills	15,000 years ago	Late Pleistocene and Early Holocene	Medium to fine grained sand dunes, held in place by vegetation	Wind	Similar to present day climate	Bison, bighorn sheep
Niobrara River alluvium terrace	20,000 years ago	Late in the Pleistocene Epoch – in the Quaternary Period of the Cenozoic Era	Pebble to boulder-sized clasts (rock fragments)	River (The ancestral Niobrara R. valley during this time was 2-3 times wider, but only half as deep as modern river's trench.	This was the height of the last glaciation. No glaciers here, but a cooler climate.	Bison, mammoth, horse, camel, wolf
Cap Rock Member of the Ash Hollow Fmn. (part of the Ogallala Group)	12-9 mya	Later in the Miocene Epoch – in the Tertiary Period of the Cenozoic Era	A well-hardened, porous sandstone	River ; some layers within this formation are wind-blown volcanic ash	It may have been more arid (dry) than during the time of the Valentine Fmn.	Large tortoises, rhinos, horses, camels, more grasses and fewer trees than when the Valentine Fmn. was deposited

Valentine Fmn. (part of the Ogallala Group)	14-12 mya	Middle of Miocene Epoch - in the Tertiary Period of the Cenozoic Era	An easily-crumbled sandy unit. Consists mostly of unconsolidated fine to medium sand and semiconsolidated sandstone. Does show some cross-bedding. The lower half contains concretions.	It was deposited by a river , with alternating intervals of high-energy currents and low-energy currents.	A milder, moister climate than today's; frost-free	Mastadons, rhinos, horses, camels, grasses, subtropical trees. Hardwood forests grew on the low, broad floodplains and an open, grassy woodland or savanna grew on the slightly higher areas.
Disconformity – a type of unconformity that records a time when the rock was exposed and eroded						
Rosebud Fmn. (part of the Arikaree Group)	28-23 mya	Oligocene Epoch – in the Tertiary Period of the Cenozoic Era	A pinkish-tan siltstone. The low permeability of this formation compared with that of the loose sands of the overlying Valentine Fmn. Gives rise to numerous springs and seeps at the unconformity between the two formations.	It was deposited by a river with low energy currents on a wide, flat floodplain.	A mild and temperate climate	Few fossils have been found.