

SYSTEM	SERIES	STRATIGRAPHIC UNIT	LITHOLOGY	THICKNESS (FEET)	DESCRIPTION
TERTIARY	Oligocene to Pliocene (?)	UNCONFORMITY	Gravel deposits	10 to 25	High-level gravel, brown to red; pebbles, cobbles, and boulders of Precambrian quartz, quartzite, and schist and a minor amount of Paleozoic chert. Mapped by Darton and Paige (1925) as White River Formation.
			Pierre	650+	Shale, dark-gray; weathers brown; breaks into blocky irregular fragments; plastic; contains bentonite as beds 2+ feet thick and as partings.
			Shale		Shale in lower 60+ feet, light-gray; weathers light brown; contains ironstone concretions and fracture fillings of hematite.
		Niobrara Formation			
				265+	Calcareous shale and marl, gray; weathers tan with gray flecks. Shale thinly laminated; orange-weathering spherical concretions in middle part. Grades into underlying Carlile Shale.
		Upper Cretaceous			
			Carlile Shale	370+	Sage Breaks Member: shale, dark-gray; sandy concretions as much as 8 feet in diameter in lower part.
					Turner Sandy Member: sandstone, gray-brown, calcareous, fine-to medium-grained, subangular, thin-bedded, micaceous; interbedded with silty limestone and gray noncalcareous shale; sandy calcareous concretions dispersed throughout and a zone of concretions 8 feet in diameter at base.
		Upper Cretaceous			Lower shale member: shale, gray, silty; some calcareous mudstone interbedded in lower part.
			Upper limestone unit	35 to 80	Limestone, gray; weathers buff; fossiliferous (<i>Inoceramus labiatus</i>); thin bedded with calcareous shale interbeds; generally forms ridge crests and underlies dipslopes.
			Lower shale unit	190 to 280	Shale and a few thin limestone beds. Shale, dark-gray; weathers brown; bentonite beds as much as 2 feet thick in upper part. Limestone calcarenite, gray-brown, thin-bedded; composed of fragments and calcite prisms from pelecypod shells. Contact of unit with underlying Belle Fourche Shale drawn at base of lowest persistent limestone bed.
SUCATA	Upper Cretaceous	Belle Fourche Shale			Shale, dark-gray, clayey; bentonite as partings in the shale and as beds 5 inches to 2 feet thick throughout. Iron-manganese concretions, 2 feet thick and 6 feet across, in lower 50 feet and at base.
			Mowry Shale	125+	Shale, dark-gray, weathers medium-gray, fissile; some beds sandy or silty; bentonite as partings in shale or as beds 1+ foot thick; locally a bentonite bed 2+ feet thick at top. Basal contact drawn at the top of highest sandstone bed where Newcastle Sandstone is present; where Newcastle is absent, contact is drawn between light-colored fissile shale and the underlying darker Skull Creek Shale.
			Newcastle Sandstone	25 to 45	Sandstone, siltstone, and shale. Sandstone, light-brown, fine-to medium-grained, poorly sorted; generally thin slabby bedding but lenses 6 feet thick massively bedded; locally contains carbonized wood. Siltstone and shale, brown-gray, interbedded with the sandstone. From Rapid Creek south to sec. 19, T. 1 N., R. 8 E., the sandstone grades laterally into siltstone and shale.
		Skull Creek			
			Shale	190 to 260	Shale, dark-gray; weathers light brown; breaks into large fragments; interbedded with siltstone; very fine grained sandstone lenses in upper part.
		Lower Cretaceous			
			Fall River Formation	125+	Sandstone interbedded with shale and siltstone. Sandstone, gray to light-brown; weathers red to brown; fine grained; thinly and evenly bedded; commonly ripple marked; a few lenses of conglomerate at contact with Lakota. Shale, tan to gray; weathers red, brown, or purple. Siltstone, tan; weathers gray or brown. A transition zone at top, 10-20 feet thick, of siltstone interbedded with dark-gray or purplish-gray shale grades into overlying Skull Creek Shale.
		Inyan Kara Group			
			Lakota Formation	225 to 375	Shale, sandstone, and siltstone. Shale, gray to buff near top, dark gray or brown lower in section; plastic; silty; carbonaceous near top and base. Locally, a 30± foot thick gray to tan hard clay-siltstone, or a 50± foot thick brown fine-grained fluvial crossbedded sandstone in upper part of formation. Sandstone, brown to light-gray, coarse to very fine grained; subrounded grains; crossbedded. Some petrified wood in lower part of formation. Erratic thickness of formation indicates channeling into underlying Morrison.
JURASSIC	Upper Jurassic	Morrison Formation		0 to 100	Shale and siltstone. Shale, gray or light-tan, sandy. Siltstone, tan or buff; red siltstone lenses locally in lower part.
			Unkpapa Sandstone	60	Sandstone. Upper part buff to white; lower 5-30 feet yellow; fine grained; subrounded grains. Where Unkpapa is thick the overlying Morrison is thin. In W 1/2 sec. 26, T. 2 N., R. 7 E., the Unkpapa appears to grade laterally into Morrison by becoming finer grained.
		Sundance Formation		50 to 150	
				75+	Redwater Shale Member: shale, gray, silty, glauconitic; sandy fossiliferous limestone near top.