





































Geology 24K Style - Colors

| | | |
|---|---|---|
|  Quaternary 1 |  Jurassic 1 |  Pennsylvanian 5 |
|  Quaternary 2 |  Jurassic 2 |  Mississippian 1 |
|  Quaternary 3 |  Jurassic 3 |  Mississippian 2 |
|  Quaternary 4 |  Jurassic 4 |  Mississippian 3 |
|  Tertiary 1 |  Jurassic 5 |  Mississippian 4 |
|  Tertiary 2 |  Triassic 1 |  Mississippian 5 |
|  Tertiary 3 |  Triassic 2 |  Devonian 1 |
|  Tertiary 4 |  Triassic 3 |  Devonian 2 |
|  Tertiary 5 |  Triassic 4 |  Devonian 3 |
|  Tertiary 6 |  Triassic 5 |  Devonian 4 |
|  Tertiary 7 |  Permian 1 |  Devonian 5 |
|  Tertiary 8 |  Permian 2 |  Silurian 1 |
|  Cretaceous 1 |  Permian 3 |  Silurian 2 |
|  Cretaceous 2 |  Permian 4 |  Silurian 3 |
|  Cretaceous 3 |  Pennsylvanian 1 |  Silurian 4 |
|  Cretaceous 4 |  Pennsylvanian 2 |  Ordovician 1 |
|  Cretaceous 5 |  Pennsylvanian 3 |  Ordovician 2 |
|  Cretaceous 6 |  Pennsylvanian 4 |  Ordovician 3 |

Geology 24K Style - Colors

| | | |
|---|--|--|
|  Ordovician 4 |  Precambrian 12 |  Volcanic 8 |
|  Ordovician 5 |  Precambrian 13 |  Volcanic 9 |
|  Cambrian 1 |  Precambrian 14 | |
|  Cambrian 2 |  Precambrian 15 | |
|  Cambrian 3 |  Precambrian 16 | |
|  Cambrian 4 |  Precambrian 17 | |
|  Cambrian 5 |  Precambrian 18 | |
|  Precambrian 1 |  Precambrian 19 | |
|  Precambrian 2 |  Precambrian 20 | |
|  Precambrian 3 |  Precambrian 21 | |
|  Precambrian 4 |  Precambrian 22 | |
|  Precambrian 5 |  Volcanic 1 | |
|  Precambrian 6 |  Volcanic 2 | |
|  Precambrian 7 |  Volcanic 3 | |
|  Precambrian 8 |  Volcanic 4 | |
|  Precambrian 9 |  Volcanic 5 | |
|  Precambrian 10 |  Volcanic 6 | |
|  Precambrian 11 |  Volcanic 7 | |

Geology 24K Style - Fill Symbols

| | | | |
|--|-------------------------------------|---|---|
|  | 731 Vitrophyre |  | 625 Oil Shale |
|  | 317 Igneous |  | 627 Limestone |
|  | 407 Igneous |  | 636 Sandy Limestone |
|  | 502 Periglacial |  | 637 Silty Limestone |
|  | 504 Periglacial |  | 638 Argillaceous Limestone |
|  | 503 Periglacial |  | 642 Dolomite |
|  | 601 Gravel, Open |  | 658 Coal |
|  | 602 Gravel, Closed |  | 661 Flint Clay |
|  | 605 Breccia, Open |  | 667 Gypsum |
|  | 607 Sand |  | 668 Salt |
|  | 612 Argillaceous or Shaly Sandstone |  | 669 Interbedded Sandstone and Siltstone |
|  | 613 Calcareous Sandstone |  | 702 Quartzite |
|  | 614 Dolomitic Sandstone |  | 711 Tuffaceous Rock |
|  | 616 Silt, Siltstone, or Silty Shale |  | 712 Crystal Tuff |
|  | 617 Calcareous Siltstone |  | 713 Devitrified Tuff |
|  | 619 Sandy or Silty Shale |  | 716 Zeolitic Rock |
|  | 620 Clay or Clay Shale |  | 721 Massive Igneous Rock 1 |
|  | 624 Carbonaceous Shale |  | 723 Massive Igneous Rock 3 |

Geology 24K Style - Fill Symbols



724 Massive Igneous Rock 4



725 Massive Igneous Rock 5



728 Massive Igneous Rock 8

Geology 24K Style - Labels

AaBbYyZz Strike or Dip

AaBbYyZz Fault Name


AaBbYyZz Bedrock Geology Type

Geology 24K Style - Legend Items


Legend


Layer Name Bedrock Geology


Heading


 Label *Description*


Geology 24K Style - Line Symbols


-  Contact - Certain


-  Contact - Approximately located


-  Contact - Approximately located, queried


-  Contact - Inferred


-  Contact - Inferred, queried


-  Contact - Concealed


-  Contact - Concealed, queried


-  Gradational contact - Certain


-  Gradational contact - Approximately located


-  Gradational contact - Approximately located, queried

-  Boundary - Located by geophysical methods
















-  Geophysical data collection line - Accurately located

-  Geophysical data collection line - Aerial survey

-  Coal bed - Certain

-  Clay bed - Approximately located

Geology 24K Style - Line Symbols

-  Clay bed - Approximately located, queried
-  Clay bed - Concealed
-  Clay bed - Concealed, queried
-  Dike 1 - Certain
-  Dike 1 - Approximately located
-  Dike 2 - Certain
-  Dike 2 - Approximately located
-  Dike 3 - Certain
-  Dike 3 - Approximately located
-  Fault - Certain
-  Fault - Approximately located
-  Fault - Approximately located, queried
-  Fault - Inferred
-  Fault - Inferred, queried
-  Fault - Concealed

Geology 24K Style - Line Symbols

| | |
|---------|---|
|? | Fault - Concealed, queried |
| — · — | Fault - Located by geophysical methods |
| ———— | Normal fault - Certain |
| — — — · | Normal fault - Approximately located |
| —?— — · | Normal fault - Approximately located, queried |
| ----- | Normal fault - Inferred |
| ---?--- | Normal fault - Inferred, queried |
| | Normal fault - Concealed |
|? | Normal fault - Concealed, queried |
| ———— | Strike-slip fault, right lateral - Certain |
| — — — · | Strike-slip fault, right lateral - Approximately located |
| —?— — · | Strike-slip fault, right lateral - Approximately located, queried |
| ----- | Strike-slip fault, right lateral - Inferred |
| ---?--- | Strike-slip fault, right lateral - Inferred, queried |
| | Strike-slip fault, right lateral - Concealed |

Geology 24K Style - Line Symbols

-?· Strike-slip fault, right lateral - Concealed, queried

- Strike-slip fault, left lateral - Certain

- — — · Strike-slip fault, left lateral - Approximately located

- ?— — · Strike-slip fault, left lateral - Approximately located, queried

- Strike-slip fault, left lateral - Inferred

- ?--- Strike-slip fault, left lateral - Inferred, queried

- Strike-slip fault, left lateral - Concealed

-?· Strike-slip fault, left lateral - Concealed, queried

- ▲——▲ Thrust fault, 1st generation - Certain

- ▲— · Thrust fault, 1st generation - Approximately located

- ▲—? Thrust fault, 1st generation - Approximately located, queried





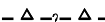










- ▲--▲- Thrust fault, 1st generation - Inferred

- ▲-?-▲-? Thrust fault, 1st generation - Inferred, queried

- ..▲...▲..▲ Thrust fault, 1st generation - Concealed

- ..▲..?..▲..? Thrust fault, 1st generation - Concealed, queried

Geology 24K Style - Line Symbols

-  Thrust fault, 2nd generation - Certain
-  Thrust fault, 2nd generation - Approximately located
-  Thrust fault, 2nd generation - Approximately located, queried
-  Thrust fault, 2nd generation - Inferred
-  Thrust fault, 2nd generation - Inferred, queried
-  Thrust fault, 2nd generation - Concealed
-  Thrust fault, 2nd generation - Concealed, queried
-  Thrust fault, 3rd generation - Certain
-  Thrust fault, 3rd generation - Approximately located
-  Thrust fault, 3rd generation - Approximately located, queried
-  Thrust fault, 3rd generation - Inferred
-  Thrust fault, 3rd generation - Inferred, queried
-  Thrust fault, 3rd generation - Concealed
-  Thrust fault, 3rd generation - Concealed, queried
-  Overturned thrust fault, 1st generation - Certain

Geology 24K Style - Line Symbols

- ▲—· Overturned thrust fault, 1st generation - Approximately located
- ▲—? Overturned thrust fault, 1st generation - Approximately located, queried
- ▲--- Overturned thrust fault, 1st generation - Inferred
- ▲-?-▲-? Overturned thrust fault, 1st generation - Inferred, queried
- ..▲...▲...▲ Overturned thrust fault, 1st generation - Concealed
- ..▲-?-▲-? Overturned thrust fault, 1st generation - Concealed, queried
- ▲—▲— Overturned thrust fault, 2nd generation - Certain
- ▲—· Overturned thrust fault, 2nd generation - Approximately located
- ▲—? Overturned thrust fault, 2nd generation - Approximately located, queried
- ▲--- Overturned thrust fault, 2nd generation - Inferred
- ▲-?-▲-? Overturned thrust fault, 2nd generation - Inferred, queried
- ..▲...▲...▲ Overturned thrust fault, 2nd generation - Concealed
- ..▲-?-▲-? Overturned thrust fault, 2nd generation - Concealed, queried
- ▲—▲— Overturned thrust fault, 3rd generation - Certain
- ▲—▲ Overturned thrust fault, 3rd generation - Approximately located

Geology 24K Styles - Line Symbols

- ▲ —? Overturned thrust fault, 3rd generation - Approximately located, queried

- ▲ -- Overturned thrust fault, 3rd generation - Inferred

- ▲-?-▲-? Overturned thrust fault, 3rd generation - Inferred, queried

- ..▲...▲...▲ Overturned thrust fault, 3rd generation - Concealed

- ..▲-?-▲-? Overturned thrust fault, 3rd generation - Concealed, queried

- ● — Detachment fault, 1st generation - Certain

- ● —? Detachment fault, 1st generation - Approximately located

- ● —? Detachment fault, 1st generation - Approximately located, queried

- -●- Detachment fault, 1st generation - Inferred

- ?-●-? Detachment fault, 1st generation - Inferred, queried

- ..●.....●.. Detachment fault, 1st generation - Concealed

- ..●-?-●-? Detachment fault, 1st generation - Concealed, queried

- ○ — Detachment fault, 2nd generation - Certain

- ○ —? Detachment fault, 2nd generation - Approximately located

- ○ —? Detachment fault, 2nd generation - Approximately located, queried

Geology 24K Style - Line Symbols

- - - - - Detachment fault, 2nd generation - Inferred

- - - ? - ? Detachment fault, 2nd generation - Inferred, queried

- Detachment fault, 2nd generation - Concealed

- ? Detachment fault, 2nd generation - Concealed, queried

- — — Detachment fault, 3rd generation - Certain

- — — . Detachment fault, 3rd generation - Approximately located

- — — ? Detachment fault, 3rd generation - Approximately located, queried

- - - - - Detachment fault, 3rd generation - Inferred

- - - ? - ? Detachment fault, 3rd generation - Inferred, queried

- Detachment fault, 3rd generation - Concealed

- ? Detachment fault, 3rd generation - Concealed, queried


- — Lineament

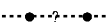
- — ● Vein - Certain

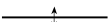
- ● — ● Vein - Approximately located

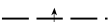
- ● — ? — ● Vein - Approximately located, queried


Geology 24K Style - Line Symbols


- 
Vein - Concealed


- 
Vein - Concealed, queried


- 
Anticline - Certain


- 
Anticline - Approximately located


- 
Anticline - Inferred


- 
Anticline - Concealed


- 
Anticline - Approximately located, queried


- 
Anticline - Inferred, queried


- 
Anticline - Concealed, queried


- 
Overtured anticline - Certain

- 
Overtured anticline - Approximately located

- 
Overtured anticline - Inferred

- 
Overtured anticline - Concealed

- 
Overtured anticline - Approximately located, queried

- 
Overtured anticline - Inferred, queried

Geology 24K Style - Line Symbols

- ⤴----- Overturned anticline - Concealed, queried

- ⤴——— Inverted Anticline - Certain

- ⤴ —· Inverted Anticline - Approximately located

- ⤴ -- Inverted Anticline - Inferred

- ⤴----- Inverted Anticline - Concealed

- ? ⤴ —· Inverted Anticline - Approximately located, queried

- ⤴ -- Inverted Anticline - Inferred, queried

- ⤴----- Inverted Anticline - Concealed, queried

- ⤵——— Syncline - Certain

- ⤵ —· Syncline - Approximately located

- ⤵ -- Syncline - Inferred

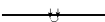
- ⤵----- Syncline - Concealed


- ? ⤵ —· Syncline - Approximately located, queried

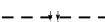
- ⤵ -- Syncline - Inferred, queried


- ⤵----- Syncline - Concealed, queried


Geology 24K Style - Line Symbols


-  Overturned syncline - Certain


-  Overturned syncline - Approximately located


-  Overturned syncline - Inferred


-  Overturned syncline - Concealed


-  Overturned syncline - Approximately located, queried


-  Overturned syncline - Inferred, queried


-  Overturned syncline - Concealed, queried


-  Inverted syncline - Certain


-  Inverted syncline - Approximately located


-  Inverted syncline - Inferred

-  Inverted syncline - Concealed

-  Inverted syncline - Approximately located, queried

-  Inverted syncline - Inferred, queried

-  Inverted syncline - Concealed, queried

-  Monocline - Certain

Geology 24K Style - Line Symbols

- † — · Monocline - Approximately located
- † -- Monocline - Inferred
- † Monocline - Concealed
- † — · Monocline - Approximately located, queried
- † -- Monocline - Inferred, queried
- † Monocline - Concealed, queried

Geology 24K Style - Marker Symbols

- ✦ Minor Dome
- ✦ Minor Basin
- ⊕ Horizontal bedding
- ┆ Inclined bedding--Showing strike and direction of dip
- ┆ Inclined bedding--Showing approximate strike and direction of dip
- ∩ Inclined and crenulated or warped bedding--Showing approximate strike and dip
- ┆ Inclined beds--Showing strike and dip. Top of beds known from local features
- ┆ Overturned bedding--Showing strike and dip
- ┆ Overturned bedding--Showing strike and dip. Top direction of beds known from local features
- ┆ Bedding overturned more than 180 degrees--Showing strike and dip
- ┆ Vertical bedding--Showing strike
- ┆ Vertical bedding--Showing strike and direction of top beds; top known from local features
- ┆ Graded bedding
- ┆ Overturned graded bedding
- ┆ Inclined bedding in crossbedded rocks- showing approx strike and dip

Geology 24K Style - Marker Symbols

- ⊖ Overturned bedding in crossbedded rocks--showing approx strike and dip
- ⊖ Horizontal bedding, determined from aerial photographs
- ⊖ Gently inclined bedding, determined from aerial photographs--showing approx strike and dir. of dip
- ⊖ Moderately inclined bedding, determined from aerial photographs--showing approx strike and dir. of dip
- ⊖ Steeply inclined bedding, determined from aerial photographs--showing approx strike and dir. of dip
- ⊖ Vertical or near-vertical bedding, determined from aerial photographs--showing approx strike
- ⊖ Photo-interpreted bedding: Strike and dip of strata, dip 5 to 15
- ⊖ Photo-interpreted bedding: Strike and dip of strata, dip 15 to 45
- ⊖ Photo-interpreted bedding: Strike and dip of strata, dip greater than 45
- ⊖ Photo-interpreted bedding: Strike and dip of strata, dip not estimated
- ⊖ Horizontal Strata
- ⊖ Vertical Strata
- ⊖ Massive igneous rock
- ⊖ Horizontal foliation in igneous rock
- ⊖ Horizontal foliation in igneous rock--Showing strike and dip

Geology 24K Style - Marker Symbols

- ⌋ Crinkled or deformed foliation in igneous rock--Showing strike and dip
- ⌋ Vertical foliation in igneous rock--Showing strike
- ⌋ Vertical or near-vertical crinkled or deformed foliation in igneous rock--Showing approx strike
- ⊕ Horizontal cumulate foliation in layered igneous rock
- ⊖ Inclined cumulate foliation in layered igneous rock--Showing strike and dip
- ⊖ Crinkled or deformed cumulate foliation in layered igneous rock--Showing approx strike and dip
- ⌋ Inclined cumulate foliation parallel to upright layering in igneous rock--Showing strike and dip
- ⌋ Inclined cumulate foliation parallel to overturned layering in igneous rock--Showing strike and dip
- ⌋ Vertical cumulate foliation or layering in igneous rock--Showing strike
- ⌋ Vertical cumulate foliation in igneous rock--Showing strike and direction of top layers
- ⌋ Vertical or near-vertical crinkled or deformed cumulate foliation or layering in igneous rock
- ⊕ Horizontal compaction foliation in ash-flow tuff
- ⌋ Inclined foliation in ash-flow tuff
- ⌋ Crinkled or deformed compaction foliation in ash-flow tuff--Showing approximate strike
- ⌋ Vertical or near vertical compaction foliation in ash-flow tuff--Showing strike

Geology 24K Style - Marker Symbols

- ◉ Horizontal foliation in layered gneiss
- ◉ Horizontal foliation parallel to bedding in layered gneiss
- † Inclined foliation in layered gneiss--Showing strike and dip
- ‡ Crinkled or deformed foliation in layered gneiss--Showing approximate strike and dip
- † Inclined foliation parallel to upright beds in layered gneiss--Showing strike and dip
- † Inclined foliation parallel to overturned beds in layered gneiss--Showing strike and dip
- † Vertical foliation in layered gneiss--Showing strike
- † Vertical foliation in layered gneiss--Showing strike and direction of dip
- † Vertical or near-vertical crinkled or deformed foliation in layered gneiss
- ◉ Horizontal joint, type 2
- ◉ Horizontal joint, type 1
- † Inclined joint, type 1 --showing strike and dip
- † Inclined joint, type 2 showing strike and dip
- † Vertical or near-vertical joint, type 1 --showing strike
- † Vertical or near-vertical joint, type 2 --showing strike

Geology 24K Style - Marker Symbols

- ⊕ Horizontal cleavage, type 1
- ⊕ Horizontal cleavage type 2
- [Inclined cleavage--Showing strike and dip
- [Inclined cleavage--Showing strike and dip type 2
- I Vertical cleavage--Showing strike
- I Vertical cleavage--Showing strike type 2
- † Minor antiform--Inclined axial surface
- † Minor antiform--Vertical axial surface
- † Minor anticline--Inclined axial surface
- † Minor anticline--Vertical axial surface
- ⊕ Minor overturned anticline--Inclined axial surface
- † Minor synform--Inclined axial surface
- † Minor synform--Vertical or near-vertical axial surface
- † Minor syncline--Inclined axial surface showing strike and dip
- † Minor syncline--Vertical or near vertical axial surface showing strike

Geology 24K Style - Marker Symbols

- ⚡ Minor overturned syncline--Inclined axial surface showing strike and dip
- ↕ Horizontal minor fold axis showing bearing
- ↘ Inclined minor fold axis showing bearing and plunge
- ♦ Vertical minor fold axis
- ↘ Minor anticline--Showing bearing and plunge
- ↙ Minor syncline--Showing bearing and plunge
- ↘ Minor fold, dextral rotation sense--Showing bearing and plunge
- ↙ Minor fold, sinistral rotation sense--Showing bearing and plunge
- ↘ Minor folds--Showing bearing and plunge
- ⚡ Boudinage--Showing bearing and plunge
- ↓ Lineation--Showing bearing and plunge
- ↑ Horizontal lineation
- + Vertical lineation
- ↘ Lineation, minerals on foliation surface
- ↘ Lineation, mineral streaks

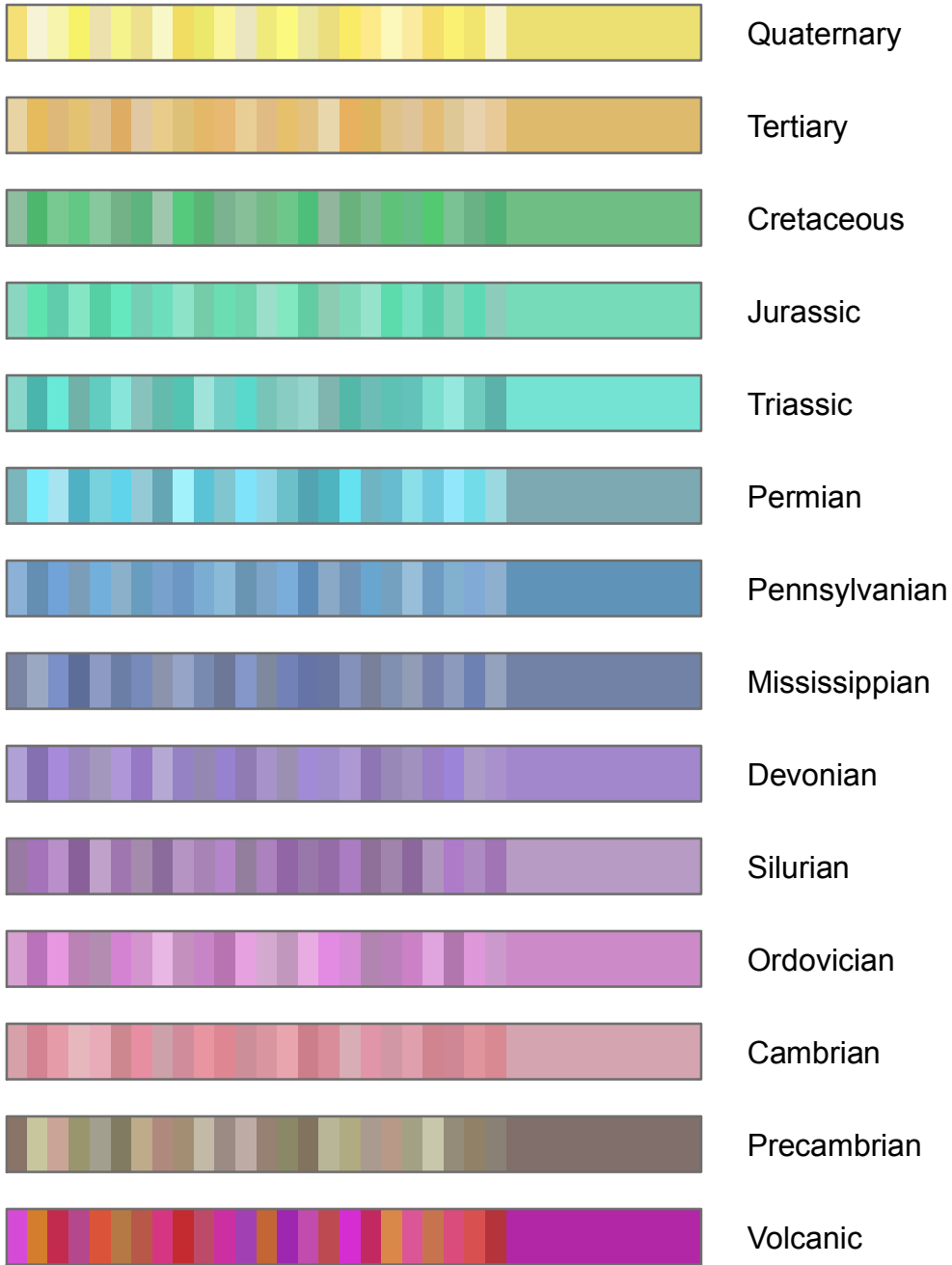
Geology 24K Style - Marker Symbols

- ↙ Slip lineation
- ↙ Flow lineation
- ‡ Lineation, flow folds
- ↓ Flow direction
- ‡ Lineation--Aligned mineral grains in cumulate rocks
- ‡ Lineation--Trough banding in cumulate rocks
- ‡ Lineation--Flow direction in ash-flow tuff
- ‡ Lineation--Minor folds normal to flow in ash-flow tuff
- ‡ Lineation at intersection of bedding and cleavage--Showing bearing and plunge
- ‡ Lineation at intersection of foliation and cleavage--Showing bearing and plunge
- ‡ Lineation on cleavage surface--Showing bearing and plunge
- ↙ Slip lineation on a fault or shear surface--Showing bearing and plunge
- ‡ Penetrative lineation--Showing bearing and plunge in combination with foliation symbol
- * Pingo
- * Kettle

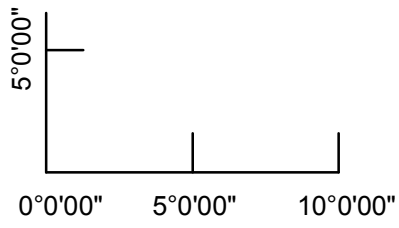
Geology 24K Style - Marker Symbols

- † Sediment transport direction--Determined from dune forms
- ‡ Sediment transport direction--Determined from eolian crossbedding in vertical section
- ‡ Sediment transport direction--Determined from dune bedding in horizontal section

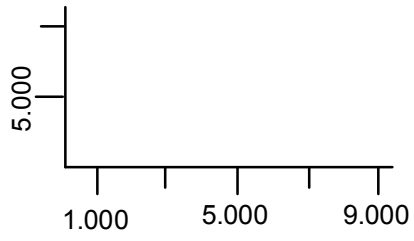
Geology 24K Style - Color Ramps



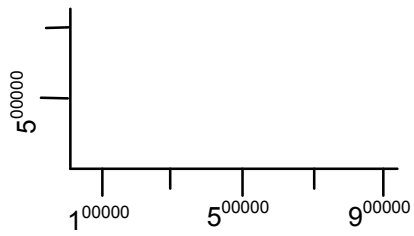
Geology 24K Style - Reference Systems



Decimal Degree Grid

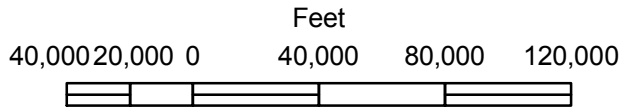


State Plane Grid

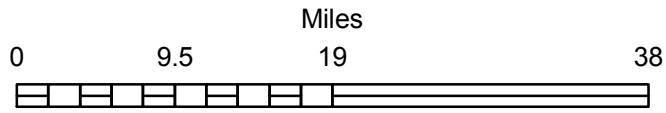


UTM Grid

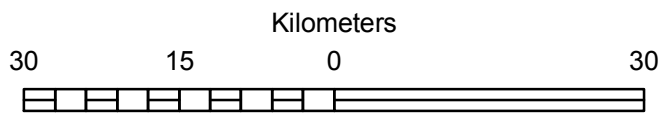
Geology 24K Style - Scale Bars



Feet Scale Bar



Mile Scale Bar



Kilometer Scale Bar

Geology 24K Style - Text Symbols

AaBbYyZz Quadrangle Name

AaBbYyZz State Name

AaBbYyZz Mapping Organization

AaBbYyZz Adjacent (Quadrangle)

AaBbYyZz Organization Credits

AaBbYyZz Magnetic North Description

AaBbYyZz Funding Credits

AaBbYyZz Map Title

AaBbYyZz Date

AaBbYyZz Authors

AaBbYyZz Nomenclature/Ref #

AaBbYyZz Projection Information

AaBbYyZz Reference Map Title