Table A1. Outline of the three highest tiers of the U.S. soil classification system (Soil Taxonomy), revised 12/01/2008 (NASIS, 2008). Note: the following sequence is arrayed by alphabetical order, NOT by "key" sequence.

Orders	Suborders	Great Groups
Alfisols	Aqualfs	Albaqualfs
		Cryaqualfs
		Duraqualfs
		Endoaqualfs
		Epiaqualfs
		Fragiaqualfs
		Glossaqualfs
		Kandiaqualfs
		Natraqualfs
		Plinthaqualfs
		Vermaqualfs
	Cryalfs	Glossocryalfs
		Haplocryalfs
		Palecryalfs
	Udalfs	Ferrudalfs
		Fragiudalfs
		Fraglossudalfs
		Glossudalfs
		Hapludalfs
		Kandiudalfs
		Kanhapludalfs
		Natrudalfs
		Paleudalfs
		Rhodudalfs
	Ustalfs	Durustalfs
		Haplustalfs
		Kandiustalfs
		Kanhaplustalfs
		Natrustalfs
		Paleustalfs
		Plinthustalfs
		Rhodustalfs
	Xeralfs	Durixeralfs
		Fragixeralfs
		Haploxeralfs
		Natrixeralfs

Orders	Suborders	Great Groups
		Palexeralfs
		Plinthoxeralfs
		Rhodoxeralfs
Andisols	Aquands	Cryaquands
		Duraquands
		Endoaquands
		Epiaquands
		Gelaquands
		Melanaquands
		Placaquands
		Vitraquands
	Cryands	Duricryands
		Fluvicryands
		Haplocryands
		Hydrocryands
		Melanocryands
		Vitricryands
	Gelands	Vitrigelands
	Torrands	Duritorrands
		Haplotorrands
		Vitritorrands
	Udands	Durudands
		Fluvudands
		Hapludands
		Hydrudands
		Melanudands
		Placudands
	Ustands	Durustands
		Haplustands
	Vitrands	Udivitrands
		Ustivitrands
	Xerands	Haploxerands
		Melanoxerands
		Vitrixerands
Aridisols	Argids	Calciargids
		Gypsiargids
		Haplargids
		Natrargids
		Paleargids
		Petroargids
	Calcids	Haplocalcids
		Petrocalcids
	Cambids	Anthracambids
		Aquicambids
		Haplocambids
		Petrocambids
	Cryids	Argicryids
		Calcicryids
		Gypsicryids
		Haplocryids
		Petrocryids
		Salicryids
	Durids	Argidurids
		Haplodurids
		Natridurids
	Gypsids	Argigypsids
		Calcigypsids
		Haplogypsids
		Natrigypsids
		Petrogypsids
	Salids	Aquisalids
		Haplosalids
Entisols	Aquents	Cryaquents
		Endoaquents
		Epiaquents
		Fluvaquents
		Gelaquents
		Hydraquents
		Psammaquents
		Sulfaquents
	Arents	Torriarents
		Udarents
		Ustarents
		Xerarents
	Fluvents	Cryofluvents
		Gellifluvent
		Torrifluvents
		Udifluvents
		Ustifluvents
		Xerofluvents
	Orthents	Cryorthents
		Gelorthent
		Torriorthents
		Udorthents
		Ustorthents
		Xerorthents
	Psamments	Cryopsamments
		Quartzipsamments
		Torrippsamments
		Tropopsamments
		Udipsamments
		Ustipsamments
		Xeropsamments
Gelisols	Histels	Fibristels
		Folistels
		Glacistels
		Hemsitels
		Sapristels
	Orthels	Anhyorthels
		Aquorthel
		Argiorthels
		Haplorthels
		Historthels
		Mollorthels
		Psammorthels
		Umbrothels
	Turbels	Anhyturbels
		Aquiturbels
		Haploturbels
		Histoturbels
		Molliturbels
		Psammoturbels
		Umbriturbels
Histosols	Fibrists	Cryofibrists

Orders	Suborders	Great Groups
		Haplofibrists
		Sphagnofibrists
	Folists	Cryofolists
		Torrifolists
		Tropofolists
		Udifolists
		Ustifolists
	Hemists	Cryohemists
		Haplohemists
		Luvihemists
		Sulfihemists
		Sulfohemists
	Saprists	Cryosaprists
		Haplohemists
		Sulfisaprists
		Sulfosaprists
Inceptisols	Aquepts	Cryaquepts
		Endoaquepts
		Epiaquepts
		Fragiaquepts
		Gelaquepts
		Halaquepts
		Humaquepts
		Petraquepts
		Sulfaquepts
		Vermaquepts
	Anthrepts	Haplanthrepts
		Plagganthrepts
	Cryepts	Calcicryepts
		Dystrocryepts
		Haplocryepts
		Humicryepts
	Gelepts	Dystrogelepts
		Eutrogelepts
	Udepts	Durudepts
		Dystrudepts
		Eutrudepts
		Fragiudepts
		Sulfudepts
	Ustepts	Calciustepts
		Durustepts
		Dystrustepts
		Haplustepts
	Xerepts	Calcixerepts
		Durixerepts
		Dystoxerepts
		Fragixerepts
		Haploxerepts
Mollisols	Albolls	Argialbolls
		Natralbolls
	Aquolls	Argiaquolls
		Calciaquolls
		Cryaquolls
		Duraquolls
		Endoaquolls
		Epiaquolls
		Natraquolls

Orders	Suborders	Great Groups
	Cryolls	Argicryolls
		Calcicryolls
		Duricryolls
		Haplocryolls
		Natricryolls
		Palecryolls
	Gelolls	Haplogelolls
	Rendolls	Cryrendolls
		Haprendolls
	Udolls	Argiudolls
		Calciudolls
		Hapludolls
		Natrudolls
		Paleudolls
		Vermudolls
	Ustolls	Argiustolls
		Calciustolls
		Durustolls
		Haplustolls
		Natrustolls
		Paleustolls
		Vermustolls
	Xerolls	Argixerolls
		Calcixerolls
		Durixerolls
		Haploxerolls
		Natrixerolls
		Palexerolls
Oxisols	Aquox	Acraquox
		Eutraquox
		Haplaquox
		Plinthaquox
	Perox	Acroperox
		Eutroperox
		Haploperox
		Kandiperox
		Sombriperox
	Torrox	Acrotorrox
		Eutrotorrox
		Haplotorrox
		Eutrudox
		Hapludox
		Kandiudox
		Sombriudox
	Ustox	Acrustox
		Eutrustox
		Haplustox
		Kandiustox
		Sombriustox
Spodosols	Aquods	Alaquods
		Cryaquods
		Duraquods
		Endoaquods
		Epiaquods
		Fragiaquods
		Placaquods
	Cryods	Duricryods

Orders	Suborders	Great Groups
		Haplocryods
		Humicryods
		Placocryods
	Gelods	Haplogelods
		Humigelods
	Humods	Durihumods
		Fragihumods
		Haplohumods
		Placohumods
	Orthods	Alorthods
		Durorthods
		Fragiorthods
		Haplorthods
		Placorthods
Ultisols	Aquults	Albaquults
		Endoaquults
		Epiaquults
		Fragiaquults
		Kandiaquults
		Kanhaplaquults
		Paleaquults
		Plinthaquults
		Umbraquults
	Humults	Haplohumults
		Kandihumults
		Kanhaplohumults
		Palehumults
		Plinthohumults
		Sombrihumults
	Udults	Fragiudults
		Hapludults
		Kandiudults
		Kanhapludults
		Paleudults

Orders	Suborders	Great Groups
		Plinthudults
		Rhodudults
	Ustults	Haplustults
		Kandiustults
		Kanhaplustults
		Paleustults
		Plinthustults
		Rhodustults
	Xerults	Haploxerults
		Palexerults
Vertisols	Aquerts	Calciaquerts
		Duraquerts
		Dystraquerts
		Endoaquerts
		Epiaquerts
		Natraquerts
		Salaquerts
		Sulfaquerts
	Cryerts	Haplocryerts
		Humicryerts
	Torrerts	Calcitorrerts
		Gypsitorrerts
		Haplotorrerts
		Salitorrerts
	Uderts	Dystruderts
		Hapluderts
	Usterts	Calciusterts
		Dystrusterts
		Gypsiusterts
		Haplusterts
		Salusterts
	Xererts	Calcixererts
		Durixererts
		Haploxererts

Table A2. Prefixes and their connotations for names of great groups in the U.S. soil classification system (Soil taxonomy).

Prefix	Connotation of prefix
acr	Extreme weathering
al	High aluminum, low iron
alb	Presence of an albic horizon
anhy	Very dry
anthr	An anthropic epipedon
aqu	Aquic conditions
argi	Presence of an argillic horizon
calci, calc A	calcic horizon
camb	A cambic horizon
cry	Cold
dur	A duripan
dystr, dys	Low base saturation
endo	Implying a groundwater table
epi	Implying a perched water table
eutr	High base saturation
ferr	Presence of iron
fibr	Least decomposed stage
fluv	Floodplain
fol	Mass of leaves
fragi	Presence of fragipan
fragloss	Refer to the formative elements fragi and
fulv	Dark brown color, presence of organic carbon
glac	Ice lenses or wedges
gloss	Tongued
gyps	Presence of gypsic horizon
hal	Salty
hapl	Minimum horizon development
hem	Intermediate stage of decomposition
hist	Presence of organic materials
hum	Presence of humus
hydr	Presence of water
kand, kan	1:1 layer silicate clays
luv	Illuvial
melan	Black, presence of organic C
natr	Presence of natric horizon

Prefix	Connotation of prefix
pale	Excessive development
petr	A cemented horizon
plac	Presence of a thinpan
plagg	Presence of plaggen horizon
plinth	Presence of plinthite
psamm	Sandy textures
quartz	High quartz content
rhod	Dark red color
sal	Presence of salic horizon
sapr	Most decomposed stage
somb	Presence of a sombric horizon
sphagn	Presence of Sphagnum

Prefix	Connotation of prefix
sulf	Presence of sulfides or their oxidation products
torr	Torric moisture regime
ud	Udic moisture regime
umbr	Presence of umbric epipedon
ust	Ustic moisture regime
verm	Wormy or mixed by animals
vitr	Presence of glass
xer	Xeric moisture regime

[Compiled from Field Book for Describing and Sampling Soils, version 3, 2012; Keys to Soil Taxonomy, 10th ed. (2006) and 11th ed. (2009); Soil Taxonomy, 2nd ed.,1999).

Table A3. Classification scheme for phyllosilicates related to clay minerals.

Type	Group (x = charge per formula unit)	Subgroup	Species[idealized formula]†
1:1	Kaolin serpentine	Kaolins	Kaolinite $[Si_4Al_4O_{10}(OH)_8]$ Halloysite (0.7nm) $[Si_4Al_4O_{10}(OH)_8]$ tube shape Halloysite (1.0nm) $[Si_4Al_4O_{10}(OH)_8{\cdot}4H_2O]$ tube shape
	$x \sim 0$	Serpentines	Chrysotile $[Si_4Mg_6O_{10}(OH)_8]$ fibrous shape, Lizardite $[Si_4Mg_6O_{10}(OH)_8]$ platy shape, Antigorite $[Si_4Mg_6O_{10}(OH)_8]$ platy or splintery shape
2:1	Pyrophyllite talc	Pyrophyllites	Pyrophyllite $[Si_4Al_2O_{10}(OH)_2]$
	$x \sim 0$	Talcs	Talc $[Si_4Mg_3O_{10}(OH)_2]$
	Smectite	Dioctahedral smectites	Montmorillonite $[Ca_{0.25}(Si_4)(Al_{1.5}Mg_{0.5})O_{10}(OH)_2]$, Beidellite $[Ca_{0.25}(Si_{3.5}Al_{0.5})(Al_2)O_{10}(OH)_2]$, Nontronite $[Ca_{0.25}(Si_{3.5}Al_{0.5})(Fe_2)O_{10}(OH)_2]$
	x = 0.25-0.6	Trioctahedral smectites	Saponite [Ca0.34(Si3.66Al0.34)(Mg3)O10(OH)2], Hectorite [(Si, Al)4(Mg, Li)3O10(OH)2], Sauconite [(Si3.66Al0.34)(Mg, Zn)3O10(OH)2]
	Vermiculite	Dioctahedral vermiculites	Ideal ½-unit cell formula for dioctahedral vermiculite $K_{0.7}Al_2(Si_{3.3}Al_{0.7})O_{10}(OH)_2$
	$x \sim 0.6$-0.9	Trioctahedral vermiculites	Ideal ½-unit cell formula for trioctahedral vermiculite $K_{0.7}(Mg, Fe^{3+})_3(Si_{3.3}Al_{0.7})O_{10}(OH)_2$
	Mica	Dioctahedral micas	Muscovite $[K(Si_3Al)(Al_2)O_{10}(OH)_2]$ Paragonite $[Na(Si_3Al)(Al_2)O_{10}(OH)_2]$
	$x \sim 1$	Trioctahedral micas	Biotite $[K(Si_3Al)(Mg, Fe_{2+})_3O_{10}(OH)_2]$ Phlogopite $[K(Si_3Al)(Mg_3)O_{10}(OH)_2]$
	Brittle mica	Dioctahedral brittle micas	Margarite $[Ca(Si_2Al_2)(Al_2)O_{10}(OH)_2]$
	$x \sim 2$	Trioctahedral brittle micas	Clintonite $[Ca(SiAl_3)(Mg_2Al)O_{10}(OH)_2]$
	Chlorite	dral chlorites (4-5 octahedral cations per formula unit)	
	x variable	Trioctahedral chlorites (5-6 octahedral cations per formula unit)	generalized formula: $[(Si_{4-x}Al_x)^{iv}(R^{2+}, R^{3+})_3{}^{vi}O_{10}(OH)_2 \cdot \{(R^{2+}, R^{3+})_3{}^{vi}(OH)_6\}]$ Clinoclore - Mg-dominant; Chamosite - Fe(II)-dominant; Pennantite - Mn^{2+}-dominant; Nimite - Ni-dominant; Baileychlore - Zn-dominant