Experiential Learning Effectiveness in the NACTA Soils Contest

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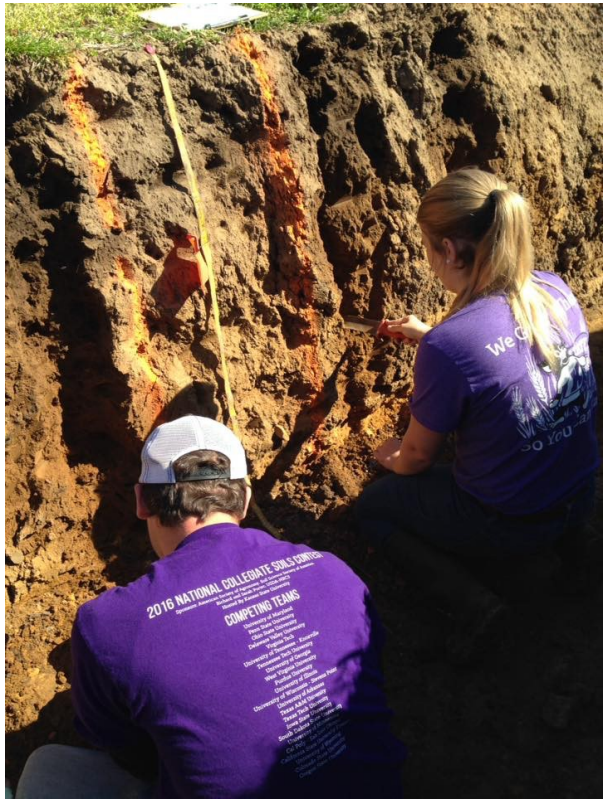
History

- NACTA Judging Conference
  - 1959- 1st NACTA sponsored judging conference
  - 1965- soils contest added
  - 1972- Junior colleges invited
  - 1 contest in spring
- National Collegiate Soils Contest (NCSC)
  - 1961
  - 7 Regional contests
  - 1 National contest
  - Sponsored by ASA-SSSA





SOIL JUDGING







Objective

- Determine experiential learning effectiveness of the NACTA Soils contest by considering components of NACTA and the National Collegiate Soils Contest (NCSC).

NACTA Soils Contest

2016

8 two-year schools

8 four-year schools

2017

7 two-year schools

8 four-year schools

2016 NACTA SOILS JUDGING
2 YEAR DIVISION
SOILS JUDGING SCORECARD

Host: University of Minnesota Crookston

SITE NO. _____ CONTESTANT I.D._____

Describe soil to _____cm. Red marker in 3rd layer at_____cm. TOTAL SCORE___

PART I

Layer / Horizon (2 pts.)	Lower Depth (cm) (2 pts.)	Boundary Distinctness (2 pts.)	Moist Consistency (2 pts.)	Color (2 pts.)	Accumulations or Mottles (2 pts.)	Coarse Fragments (2 pts.)	Texture (5 pts.)	Structure Shape (5 pts.)	Score
1.									
2.									
3.									
4.									
5.									
A B C E R	Record lower depth in cm	Abrupt (A) Clear (C) Gradual (G) Diffuse (D) None (-)	Loose (L) V. Friable (VFR) Friable (FR) Firm (FI) V. Firm (VFI) Ext. Firm (EFI)	Dark (D) Medium & Bright (MB) Medium & Dull (MD) Light (L)	None (-) Concentrations (C) Depletions (D) White (W)	None (-) Gravelly (GR) V. Gravelly (VGR) Extremely Gravelly (EGR)	S, LS, SL, L, SCL, SI, SIL, CL, C, SICL, SIC, SC	GR, PL, SBK, ABK, PR, CO, MA, SGR		

Use abbreviations for all columns except depth.

SCORE PART I _____

Part II - SITE AND SOIL CHARACTERISTICS

1. PARENT MATERIAL (5 pts each correct)
   - _____ Alluvium
   - _____ Glacial outwash
   - _____ Glacial till
   - _____ Beach deposit
   - _____ Colluvium
   - _____ Loess
   - _____ Lacustrine
   - _____ Eolian sand
   - _____ Residuum

2. LOCAL LAND FORM (5)
   - _____ Flood plain
   - _____ Stream terrace
   - _____ Outwash plain
   - _____ Kame/esker
   - _____ Till plain/drumlin/moraine
   - _____ Beach ridge
   - _____ Alluvial fan
   - _____ Loess hillslope/plain
   - _____ Lake plain
   - _____ Sand dune
   - _____ Upland

3. SLOPE (5)
   - _____ Concave
   - _____ < 1%
   - _____ 1 - <5%
   - _____ 5 - <10%
   - _____ 10 - <15%
   - _____ 15 - 20%
   - _____ > 20%

4. SURFACE RUNOFF (5)
   - _____ Negligible
   - _____ Very Low
   - _____ Low
   - _____ Medium
   - _____ High
   - _____ Very High

5. DEGREE OF EROSION (5)
   - _____ Deposition
   - _____ None to Slight (class I)
   - _____ Moderate (class II)
   - _____ Severe (class III)
   - _____ Very Severe (class IV)

6. SOIL DRAINAGE CLASS (5)
   - _____ Not wet above 100 cm (WD)
   - _____ Wet between 50 to 100 cm (MWD)
   - _____ Wet between 25 to <50 cm (SWPD)
   - _____ Wet above 25 cm (PD)

7. SOIL DEPTH (5)
   - _____ Very Shallow (< 25 cm.)
   - _____ Shallow (25 - <50 cm.)
   - _____ Moderately Deep (50 - <100 cm.)
   - _____ Deep (100 - 150 cm.)
   - _____ Very Deep (> 150 cm.)

8. PERMEABILITY/SURFACE (5)
   - _____ Slow
   - _____ Moderate
   - _____ Rapid

9. PERMEABILITY/LIMITING (5)
   - _____ Slow
   - _____ Moderate
   - _____ Rapid

10. WATER RETENTION DIFFERENCE (5)
    - _____ Very Low (<7.5 cm.)
    - _____ Low (7.5 - <15 cm.)
    - _____ Moderate (15 - 22.5 cm.)
    - _____ High (> 22.5 cm.)

Part III – INTERPRETATIONS

1. LAND CAPABILITY CLASS (5)
   - _____ Class I
   - _____ Class II
   - _____ Class III
   - _____ Class IV
   - _____ Class V
   - _____ Class VI
   - _____ Class VII

2. LAND CAPABILITY SUBCLASS (5)
   - _____ e - Subclass
   - _____ w - Subclass
   - _____ s - Subclass
   - _____ c - Subclass
   - _____ No Subclass

3. ROADFILL (5)
   - _____ Good
   - _____ Fair
   - _____ Poor
   - _____ Feature (5)

4. SEPTIC TANK ABSORPTION FIELDS (5)
   - _____ Slight
   - _____ Moderate
   - _____ Severe
   - _____ Feature (5)

5. SEWAGE LAGOONS (5)
   - _____ Slight
   - _____ Moderate
   - _____ Severe
   - _____ Feature (5)

Tie Breaker (Surface)

% clay _____

% sand _____

SCORE PARTS II & III _____

K-STATE Research and Extension

2017 NACTA Soil Judging Contest Manhattan, KS
2 Year Division
Hosted by: Kansas State University and USDA-NRCS (Kansas)
April 7, 2017

Contestant Number	
Pit Number	
Number of Horizons	
Profile Depth	
Nail Depth	

A. Morphology

Part A Score _____

HORIZON-ATION	BOUNDARY		COLOR			MOIST CONSIST	TEXTURE		STRUC-TURE.	SOIL FEATURES			SCORE
Master	Depth (cm)	Dist.	Hue	Value	Chroma		Rock Fragment Modifier	Class	Type	RMF Conc. (Y/-)	RMF Depl. (Y/-)	Matrix Conc. (Y/-)	
(2)	(2)	(2)	(2)	(2)	(2)	(2)	(2)	(5)	(5)	(1)	(1)	(1)	(29)

2017 NACTA 2-year card

II. Site and Soil Characteristics

Part II Score _____

Landform (5)	Parent Material (5*)	Slope (5)	Hillslope Profile Position (5)	Surface Runoff (5)
_____ Upland _____ Upland depression _____ Alluvial fan _____ Stream terrace _____ Floodplain _____ Footslope _____ Dunes/Interdunes	_____ Alluvium _____ Colluvium/Pedisediment _____ Eolian Sand/Eolian loam _____ Loess _____ Residuum _____ Glacial Till/Sediments	____ Concave ____ 0 to 2% ____ 2 to 5% ____ 5 to 10% ____ 10 to 15% ____ 15 to 25% ____ >25%	____ Summit ____ Shoulder ____ Backslope ____ Footslope ____ Toeslope ____ None (gradient <2%)	____ Negligible/Ponded ____ Very Low ____ Low ____ Medium ____ High ____ Very High

Hydraulic Conductivity (5 each)		Effective Soil Depth (5)	Water Retention Diff. (5)	Soil Wetness Class (5)	TOTAL SCORE
Surface Layer	Limiting Layer	cm	cm	cm	
____ High ____ Moderate ____ Low	_____ High _____ Moderate _____ Low	_____ Very Deep (> 150) _____ Deep (>100 -150) _____ Mod. Deep (>50 - 100) _____ Shallow (25-50) _____ Very Shallow (< 25)	_____ Very Low (< 7.5) _____ Low (7.5 - <15.0) _____ Medium (15.0 - 22.5) _____ High (> 22.5)	_____ Class 1 (> 150) _____ Class 2 (>100 - 150) _____ Class 3 (>50 - 100) _____ Class 4 (25 - 50) _____ Class 5 (< 25)	**Part I** _____ **Part II** _____ **Part III** _____ **Total** _____

III. Interpretations

Part III Score _____

Septic Tank Absorption Fields (5)	Dwellings without Basements (5)	Tiebreaker—Surface horizon
____ Suitable ____ Provisionally Suitable ____ Unsuitable	____ Slight ____ Moderate ____ Severe	Clay % - _____ Sand % - _____

USDA United States Department of Agriculture

K·STATE Research and Extension

2017 NACTA Soil Judging Contest Manhattan, KS
4 Year Division
Hosted by: Kansas State University and USDA-NRCS (Kansas)
April 7, 2017

Contestant Number	
Pit Number	
Number of Horizons	
Profile Depth	
Nail Depth	

A. Morphology

Part A Score _____

HORIZONATION				BOUNDARY		TEXTURE			COLOR			STRUCTURE		MOIST CONSIST.	SOIL FEATURES			SCORE
Prefix	Master	Sub.	No	Depth (cm)	Dist.	Rock Frag. Mod.	Class	Clay (%)	Hue	Value	Chroma	Grade	Type		RMF Conc. (Y/-)	RMF Depl. (Y/-)	Matrix Conc. (Type)	
(2)	(4)	(2)	(2)	(2)	(2)	(2)	(4)	(2)	(2)	(2)	(2)	(2)	(2)	(2)	(2)	(2)	(2)	(40)

B. Soil Hydrology and Profile Characteristics

Part B Score _____

Hydraulic Conductivity (5 each)		Effective Soil Depth (5)	Water Retention Diff. (5)	Soil Wetness Class (5)	TOTAL SCORE
Surface Layer	Limiting Layer	cm	cm	cm	
____ High	_____ High	_____ Very Deep (> 150)	_____ Very Low (< 7.5)	_____ Class 1 (> 150)	Part A _____
____ Moderate	_____ Moderate	_____ Deep (100.1- 150)	_____ Low (7.5-15)	_____ Class 2 (100.1-150)	Part B _____
____ Low	_____ Low	_____ Mod. Deep (50.1- 100)	_____ Medium (15.1-22.5)	_____ Class 3 (50.1 – 100)	Part C _____
		_____ Shallow (25-50)	_____ High (> 22.5)	_____ Class 4 (25- 50)	Part D _____
		_____ Very Shallow (< 25)		_____ Class 5 (< 25)	Part E _____
					Total _____

2017 NACTA 4-year card

C. Site Characteristics

Part C Score _____

Landform (5)	Parent Material (5*)	Slope (5)	Hillslope Profile Position (5)	Surface Runoff (5)
____ Upland	____ Alluvium	____ 0 to 2%	____ Summit	____ Negligible/Ponded
____ Upland depression	____ Colluvium/Pedisediment	____ 2 to 6%	____ Shoulder	____ Very Low
____ Alluvial fan	____ Eolian Sand/Eolian loam	____ 6 to 9%	____ Backslope	____ Low
____ Stream terrace	____ Loess	____ 9 to 15%	____ Footslope	____ Medium
____ Floodplain	____ Residuum	____ 15 to 25%	____ Toeslope	____ High
____ Footslope	____ Glacial Till/Sediments	____ >25%	____ None (gradient <2%)	____ Very High
____ Dunes/Interdunes				

D. Soil Classification

Part D Score _____

Epipedon (5)	Diagnostic Subsurface Horizons and Features (5*)	Order (5)
____ Mollic	____ Albic	____ Vertisols
____ Ochric	____ Argillic	____ Mollisols
____ Umbric	____ Cambic	____ Alfisols
____ None	____ Calcic	____ Inceptisols
	____ Natric	____ Entisols
	____ Lithic Contact	
	____ Paralithic Contact	
	____ Slickensides	
	____ Abrupt Textural Change	
	____ Albic materials	
	____ Lamellae	
	____ Lithologic Discontinuities	
	____ Aquic Conditions	
	____ None	

E. Site Interpretations

Part E Score _____

Septic Tank Absorption Fields (5)	Rangeland Ecological Site (5)			Dwellings without Basements (5)
____ Suitable	____ Claypan	____ Loamy Upland	____ Shallow Limestone Hills	____ Slight
____ Provisionally Suitable	____ Clayey Upland	____ Loamy Lowland	____ Choppy Sands	____ Moderate
____ Unsuitable	____ Upland Hills	____ Gravelly Flint Hills	____ Other	____ Severe

USDA United States Department of Agriculture

National Collegiate Soils Contest (NCSC)

2016
23 four-year schools

2017
24 four-year schools

SCORECARD
NATIONAL SOILS CONTEST
Northern Illinois University
DeKalb, Illinois
April 23 - 28, 2017

1.	_____	_____
2.	_____	_____
3.	_____	_____
4.	_____	_____
5.	_____	_____
Total	_____	_____

Contestant I.D. _____
Site No. _____
Horizons_____
Describe to a depth of _____cm
Nail in third horizon at _____ cm

I. Soil Morphology

Score:

Horizonation				Boundary		Texture					Color			Structure		Cons.	Soil Features			Score
Master		Sub	No	Lower Depth (cm) (2)	Dist (2)	Sand% (± 5) (2)	Clay% (± 5) (2)	%CF (± 5) (2)	CF Mod. (2)	Class (2)	Hue (2)	Value (2)	Chroma (2)	Grade (2)	Shape (2)	Moist Strength (2)	Redox		Efferv. (2)	Possible (40)
Prefix (2)	LTR (2)																Depl. (2)	Conc. (2)		

II. Soil Profile Characteristics

Score:

Hydraulic Conductivity (10)		Loading Rate at 75 cm (5)	Effective Soil Depth (5)	Water Retention Difference (5)	Soil Wetness Class (5)
Surface (5)	Limiting Layer (5)				
_____High	_____High	_____ gpd/ft^2 (3)	____ V. shallow (< 25 cm)	____Very low (< 7.5 cm)	____ (< 25 cm)
_____Mod.	_____Mod.		____ Shallow (25 to 49 cm)	____Low (7.5 to < 15 cm)	____ (25 to 49 cm)
_____Low	_____Low	Ref. (2) _____	____Mod. Deep (50 to 99 cm)	____Mod. (15 to < 22.5 cm)	____ (50 to 99 cm)
			____ Deep (100 to 150 cm)	____High (≥ 22.5 cm)	____ (100 to 150 cm)
			____ Very deep (> 150 cm)		____ (> 150 cm)

v 3.0

2017 NCSC card

VARIES

III. Site Characteristics

Score:

Parent Material *(5 each)*	Landform *(5)*		Slope *(5)*	Slope Profile *(5)*	Surface Runoff *(5)*	Erosion Pot. *(5)*
____Alluvium ____Beach deposit ____Colluvium ____Eolian sand ____Glacial outwash ____Human trans. materials ____Lacustrine deposit ____Loess ____Glacial till ____Pedisediment ____Residuum	Constructional ____Floodplain ____Stream terrace ____Kame/esker ____Alluvial fan ____Loess plain/hillslope ____Outwash plain ____Sand dune ____Lake plain ____Till plain/drumlin/moraine	*Choose only one landform*	Erosional ____Upland headslope ____Upland sideslope ____Upland noseslope ____Interfluve	____ 0 to < 2% ____ 2 to < 6% ____ 6 to < 12% ____ 12 to < 20% ____ ≥ 20% _____ % slope	____ Summit ____ Shoulder ____ Backslope ____ Footslope ____ Toeslope ____ None	____Ponded ____Very slow ____Slow ____Medium ____Rapid ____Very rapid	____ Low ____ Medium ____ High

IV. Soil Classification

Score:

Epipedon *(5)*	Subsurface Horizon/ Feature (5 each)	Order *(5)*	Suborder *(5)*	Great Group *(5)*	Family Particle Size Control Section*(5)*	Family Particle Size Class *(5 each)*
____ Mollic ____ Ochric ____ Umbric ____ None	____ Albic ____ Argillic ____ Calcic ____ Cambic ____ Densic ____ Glossic ____ Lithic ____ Paralithic ____ None	____ Alfisol ____ Entisol ____ Inceptisol ____ Mollisol	____ Alb ____ Aqu ____ Fluv ____ Orth ____ Psamm ____ Ud ____ Other	_____ Alb _____ Argi _____ Calci _____ Dystr _____ Endo _____ Epi _____ Eutr _____ Fluv _____ Gloss _____ Hapl _____ Pale _____ Psamm _____Quartzi _____ Ud(i) _____ Other	____ Mineral soil surface to root-limiting layer ____ 25 cm to root limiting layer ____ 25 to 100 cm ____ Lower boundary of Ap to root limiting layer ____ Lower boundary of Ap to 100 cm ____ All of the argillic ____ Upper 50 cm of argillic ____ Upper boundary of argillic to root limiting layer ____ Upper boundary of argillic to 100 cm ____ Other	____ Sandy-skeletal ____ Loamy-skeletal ____ Clayey-skeletal ____ Sandy ____ Loamy ____ Clayey ____ Coarse-loamy ____ Fine-loamy ____ Coarse-silty ____ Fine-silty ____ Fine ____ Very-fine **Note: For strongly contrasting classes, indicate the upper class with a "1" and the lower class with a "2". For example: coarse loamy over clayey-skeletal should have a "1" marked next to coarse-loamy, and a 2 marked next to clayey-skeletal.**

VARIES

V. Interpretations

VARIES

Score:

Houses With Basements *(3)*	Septic Tank Absorption Fields *(3)*	Local Roads and Streets *(3)*	Hydric *(3)*
_____ Slight _____ Moderate _____ Severe Reason # (3): _____	_____ Slight _____ Moderate _____ Severe Reason # (3): _____	_____ Good _____ Fair _____ Poor Reason # (3): _____	_____ Yes _____ No Indicator (3) _____

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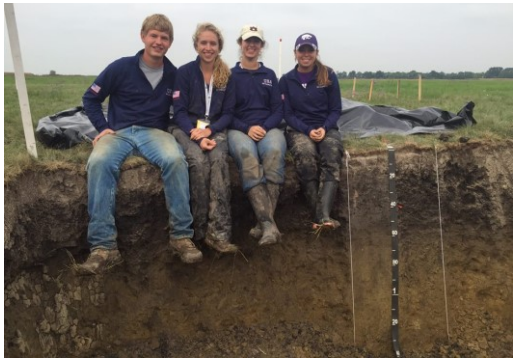
National Collegiate Soils Contest (NCSC)

- Group Judging

- Opportunity to travel beyond the US



Conclusions

- NACTA soils contest provides fundamental aspects of being a professional soil scientist
  - Opportunity for 2-year schools
- Experiential learning of classroom information

- How to elevate potential for learning:
  - Add group judging
  - Encourage 2-year contest to be more similar to 4-year contest for greater inclusion and discussion

Thank you!

- "Why do you love soil judging?"
  - Lucas: "It forces you to think critically about your environment and lets you meet some pretty cool people. ☺"
  - Tara: "I have met some of my best friends during soil judging and we get to travel and see soils from all over. Plus, it's cool to see other universities and how their agronomy departments are structured."
  - Megan: "…the connections you make with your teammates and students from other schools."
  - Logan: "…the amazing friends I've made and the hands-on experiences seeing different soils from around the U.S."
  - Peter: "I think it is important because it makes you realize the ground is soil and not dirt."