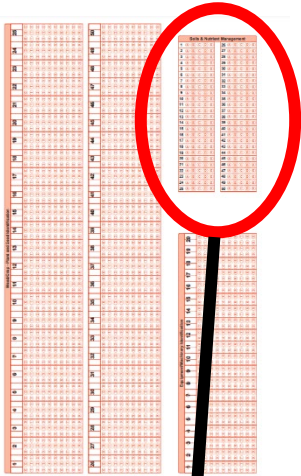




Agronomy Soils Practicum

2025 SMSU Ag Bowl Scholarship Invitational

Please use your **pencil** to fill in each correct answer in the Soils & Nutrient Management section on your scantron. Make sure **all bubbles are filled neatly and completely** so you are able to get credit for your answers.



Answer the following questions about the soils located on SMSU's own Agronomy field plots. The land is shown below from the USDA Web Soil Survey

Soils & Nutrient Management

1	A	B	C	D	E	26	A	B	C	D	E
2	A	B	C	D	E	27	A	B	C	D	E
3	A	B	C	D	E	28	A	B	C	D	E
4	A	B	C	D	E	29	A	B	C	D	E
5	A	B	C	D	E	30	A	B	C	D	E
6	A	B	C	D	E	31	A	B	C	D	E
7	A	B	C	D	E	32	A	B	C	D	E
8	A	B	C	D	E	33	A	B	C	D	E
9	A	B	C	D	E	34	A	B	C	D	E
10	A	B	C	D	E	35	A	B	C	D	E
11	A	B	C	D	E	36	A	B	C	D	E
12	A	B	C	D	E	37	A	B	C	D	E
13	A	B	C	D	E	38	A	B	C	D	E
14	A	B	C	D	E	39	A	B	C	D	E
15	A	B	C	D	E	40	A	B	C	D	E
16	A	B	C	D	E	41	A	B	C	D	E
17	A	B	C	D	E	42	A	B	C	D	E
18	A	B	C	D	E	43	A	B	C	D	E
19	A	B	C	D	E	44	A	B	C	D	E
20	A	B	C	D	E	45	A	B	C	D	E
21	A	B	C	D	E	46	A	B	C	D	E
22	A	B	C	D	E	47	A	B	C	D	E
23	A	B	C	D	E	48	A	B	C	D	E
24	A	B	C	D	E	49	A	B	C	D	E
25	A	B	C	D	E	50	A	B	C	D	E



Use the Chart to answer the following questions:

Map Unit Symbol	Map Unit Name	Drought vulnerability Rating	Building without a Basement	Surface Farm/ Garden Composting	Compaction	Organic Matter Depletion	Septic Tank Absorption Fields – Mound	Playground Limitations
51	La Prairie Loam	Moderately drought vulnerable	Very Limited	Very Limited	Medium	OM depletion moderate	Extremely limited	Somewhat Limited
86	Canisteo clay loam, 0 to 2 percent slopes	Slightly drought vulnerable	Very Limited	Very Limited	Low	OM depletion moderate	Extremely limited	Very Limited
421B	Amiret loam, 2 to 6 percent slopes	Moderately drought vulnerable	Not Limited	Somewhat Limited	Medium	OM depletion moderately high	Slightly limited	Somewhat Limited
421B2	Amiret-Swanlake loams, 2 to 6 percent slopes	Moderately drought vulnerable	Not Limited	Somewhat Limited	Medium	OM depletion moderately high	Slightly limited	Somewhat Limited
423	Seaforth loam, 1 to 3 percent slopes	Somewhat drought vulnerable	Somewhat Limited	Very Limited	Medium	OM depletion moderate	Slightly limited	Somewhat Limited
450	Rauville silty clay loam	Slightly drought vulnerable	Very Limited	Very Limited	Low	OM depletion moderately low	Extremely limited	Very Limited
L84A	Glencoe clay loam, 0 to 1 percent slopes	Slightly drought vulnerable	Very Limited	Very Limited	Low	OM depletion moderately low	Extremely limited	Very Limited
L220A	Calco silty clay loam, 0 to 2 percent slopes, occasionally flooded	Slightly drought vulnerable	Very Limited	Very Limited	Low	OM depletion moderate	Extremely limited	Very Limited

1. Drought can happen in southwest Minnesota. Of the soils listed below, which one is the least vulnerable to drought?
 - a. 51
 - b. 421B
 - c. 421B2
 - d. 423
 - e. L220A

2. We are looking to build an additional shed on our test-plot property. Based on limitations, which map unit would be the best location to build it?
 - a. 86
 - b. 421B
 - c. 450
 - d. L84A
 - e. L220A
3. When we build a new building, we would like to put a bathroom inside. This means we will need a septic tank. We learned that this area is limited for a traditional absorption field, but we can use a mound system. Where is going to be the best place a little bit away from the building to put a Mound-style septic tank?
 - a. 86
 - b. 423
 - c. 450
 - d. L84A
 - e. L220A
4. As our Agronomy students work with the ENACTUS group on campus to compost, what area listed below would be the best to have a garden compost pile?
 - a. 51
 - b. 86
 - c. 423
 - d. 450
 - e. L220A
5. Having organic matter is important to be able to do research, and grow quality crops and produce. Which soil below is currently least depleted of organic matter?
 - a. 86
 - b. 421B2
 - c. 423
 - d. 450
 - e. L220A
6. Compaction is an important part to be aware of when using large equipment and selecting the best tillage practices for an area. Of the soils listed below, which one should we be most aware of compaction and help that to influence our tillage methods?
 - a. 51
 - b. 86
 - c. 450
 - d. L84A
 - e. L220A
7. If we decided we wanted to make our test-plot area fun for the whole family, in which soils below, should we not put a playground?
 - a. 51
 - b. 421B
 - c. 421B2
 - d. 423
 - e. 450

Use the chart and information on the following two pages to answer questions 8-10.

Map symbol and soil name	Depth	Cation-exchange capacity	Soil reaction	Calcium carbonate
	<i>In</i>	<i>meq/100g</i>	<i>pH</i>	<i>Pct</i>
51—La Prairie loam				
La prairie, occasionally flooded	0-7	20-35	6.6-8.4	0-3
	7-40	20-35	6.6-8.4	0-10
	40-60	20-25	6.6-8.4	10-30
86—Canisteo clay loam, 0 to 2 percent slopes				
Canisteo	0-9	23-26	7.4-7.8	5-15
	9-16	20-26	7.4-7.8	5-15
	16-20	20-26	7.4-7.8	5-15
	20-36	12-21	7.4-8.4	15-25
	36-79	11-22	7.9-8.4	12-20
421B—Amiret loam, 2 to 6 percent slopes				
Amiret	0-11	19-27	6.1-7.3	0
	11-25	16-27	6.1-7.3	0
	25-47	12-21	7.4-8.4	15-25
	47-79	15-21	7.4-8.4	10-20
421B2—Amiret-Swanlake loams, 2 to 6 percent slopes				
Amiret	0-9	19-27	6.1-7.3	0
	9-25	16-27	6.1-7.3	0
	25-47	12-21	7.4-8.4	15-25
	47-79	15-21	7.4-8.4	10-20
Swanlake	0-8	16-21	7.4-8.4	1-10
	8-43	12-19	7.4-8.4	15-30
	43-79	15-21	7.4-8.4	10-20
423—Seaforth loam, 1 to 3 percent slopes				
Seaforth	0-11	17-24	7.4-8.4	5-20
	11-23	13-19	7.4-8.4	18-30
	23-79	15-21	7.4-8.4	10-20
450—Rauville silty clay loam				
Rauville, frequently flooded	0-38	25-31	7.4-8.4	5-15
	38-60	20-29	7.4-8.4	10-20

L84A—Glencoe clay loam, 0 to 1 percent slopes				
Glencoe	0-9	24-33	6.1-7.8	0
	9-39	22-31	6.6-7.8	0
	39-50	21-29	6.6-7.8	0
	50-79	15-23	6.6-8.4	0-20
L220A—Calco silty clay loam, 0 to 2 percent slopes, occasionally flooded				
Calco, occasionally flooded	0-10	22-26	7.4-8.4	2-10
	10-45	16-26	7.4-8.4	2-10
	45-55	16-26	7.4-8.4	2-10
	55-79	16-25	7.4-8.4	5-20

Chemical Soil Properties

This table shows estimates of some chemical characteristics and features that affect soil behavior. These estimates are given for the layers of each soil in the survey area. The estimates are based on field observations and on test data for these and similar soils.

Depth to the upper and lower boundaries of each layer is indicated.

Cation-exchange capacity is the total amount of extractable cations that can be held by the soil, expressed in terms of milliequivalents per 100 grams of soil at neutrality (pH 7.0) or at some other stated pH value. Soils having a low cation-exchange capacity hold fewer cations and may require more frequent applications of fertilizer than soils having a high cation-exchange capacity. The ability to retain cations reduces the hazard of ground-water pollution.

Effective cation-exchange capacity refers to the sum of extractable cations plus aluminum expressed in terms of milliequivalents per 100 grams of soil. It is determined for soils that have pH of less than 5.5.

Soil reaction is a measure of acidity or alkalinity. It is important in selecting crops and other plants, in evaluating soil amendments for fertility and stabilization, and in determining the risk of corrosion.

Calcium carbonate equivalent is the percent of carbonates, by weight, in the fraction of the soil less than 2 millimeters in size. The availability of plant nutrients is influenced by the amount of carbonates in the soil.

8. Based on the cation exchange rate in the topsoil of the soils in the test plot, which soil will likely need more application of fertilizer compared to other areas on the property?
- a. 51
 - b. 421B2
 - c. 423
 - d. 450
 - e. L220A
9. Which soil listed below is the most acidic at the topsoil?
- a. 51
 - b. 86
 - c. 421B
 - d. 423
 - e. 450
10. What does the amount of calcium carbonate tell us about the soils in our test plot?
- a. Compaction or Erosion
 - b. Water Infiltration
 - c. Organic Matter
 - d. Risk of Corrosion
 - e. Availability of Plant Nutrients