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Land Judging

in South Dakota

South Dakota State University
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Land Judging
in South Dakota

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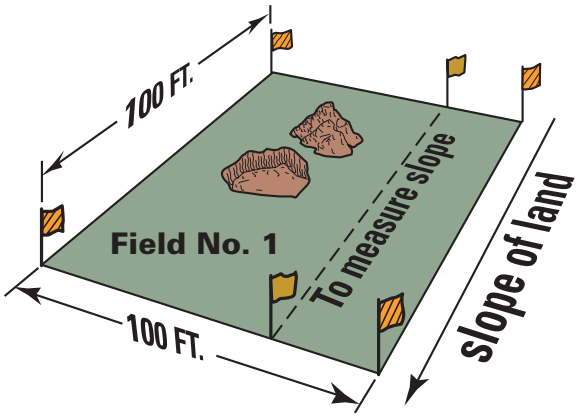
Land judging consists of measuring soil and land properties in the field, interpreting them, and then making intelligent land management decisions based on the measured and interpreted properties.

The ultimate objective in land judging is land classification. Once land is classified, you can make intelligent decisions concerning its use and management.

Land can be examined much as livestock or crops are examined, by looking at size, shape, color, and structure, then feeling texture and firmness. To judge a soil, feel its texture; evaluate depth, slope, and stoniness; calculate past erosion; and interpret its permeability and surface runoff.

Figure 1. Typical contest field.



Land is judged in the field by inspecting a vertical cross-section of soil (profile) in its natural state. Soils are three-dimensional bodies containing nearly horizontal layers of various materials called horizons.

Through practice and field work such as in land judging schools, you can learn to observe, measure, and feel the soil properties, interpret these factors, classify a soil, and determine proper soil management.

Land Judging Contest Procedures

Usually four fields numbered 1-4 are used in each contest (Fig. 1). One or more pits are dug in each field, depending on the number of participants expected. The pit(s) should expose a soil profile to approximately a 48-inch (120 cm) depth (if possible). Representative samples of topsoil and subsoil are placed in boxes near each pit. When a soil does not contain a B horizon the material underlying the topsoil (subsurface material) is used in the subsoil box. The soils in the labeled boxes are used for texture determination and to estimate soil permeability. Water for wetting these soils will be available near the boxes.

Approximately a 12-inch (30 cm) wide segment of the undisturbed soil profile should be flagged or otherwise marked. This is the area where present topsoil depth and total soil depth favorable for plant roots is determined. **No participant may touch, alter, or block the view of this segment of the pit face**. The depth of this soil profile should either be marked or a yardstick (meterstick) made available at each site.

Upon arrival, each participant will be informed of: 1) existing soil test nutrient levels; 2) crop/plant options; 3) nutrient requirement of crop/plant; 4) availability, rate of application, and nutrient content of livestock manure; 5) the original topsoil thickness, and 6) other pertinent information relative to the field. (See Field Conditions section of score card, Fig. 2, and example field site card, Fig. 3).

The official placing for each field is done before the contest by soil scientists. Their decisions are recorded and given to the tabulation committee as the official placings. Copies of the official placings will be given to each coach at the end of the contest.

Participants are given a score card for each field to be judged. Participants fill in their name or contestant number, the field number, and other information given by the contest leader.

Participants are given at least 15 minutes to judge each field. More time (20 to 30 minutes) may be necessary for larger groups. Additional time is allowed for movement from field to field.

Contest areas do not have to be square but should contain a minimum of 10,000 square feet (900 square meters). Flags will be set to indicate the boundaries. Two well-marked stakes of equal height will be set for use in estimating slope. The slope stakes will normally be set 100 feet (30 meters) apart but may be set at 50 feet (15 meters) if slope variability makes it necessary. **If the slope stakes are set at 50 feet (15 meters) the participants will be so informed by the contest officials and it will be listed under "other conditions."** Slope stakes set at 50 feet (15 meters) require the participants to double the observed elevation difference.

Use of the Score Card

While filling out the score card (Fig. 2), the participant will evaluate the five following soil properties: texture (both topsoil and subsoil), depth, past erosion, slope, and stoniness. The participants will estimate permeability and surface runoff, list the limiting properties, and determine the land capability class. Then they choose proper land management practices. **Remember, in land judging always choose the most intensive use for the land capability class selected.**

Any soil property that eliminates a field from land capability Class I is a limiting property. Limiting properties are factors that either reduce the intensity

Figure 2. **Contestant score card for SD Land Judging competitions.**

LAND JUDGING SCORE CARD

CONTESTANT NO. _____ FIELD NO. _____

NAME _____

SCHOOL/COUNTY _____

PART 1: SOIL FACTORS		
SCORE	OBSERVED SOIL PROPERTIES	
topsoil (4 pts)	TEXTURAL GROUP	
	topsoil	subsoil
	coarse	
	moderately coarse	
subsoil (4 pts)	medium	
	moderately fine	
	fine	
(3 pts)	SOIL DEPTH	
	deep (> 40")	
	moderately deep (20-40")	
	shallow (10-20")	
	very shallow (<10")	
(4 pts)	PAST EROSION	
	deposition	
	none to slight (<25%)	
	moderate (25-75%)	
	severe (>75%)	
(5 pts)	SLOPE	
	depression	
	nearly level (0-3%)	
	gently sloping (3-6%)	
	moderately sloping (6-9%)	
	strongly sloping (9-15%)	
	steep (15-25%)	
	very steep (>25%)	
(2 pts)	STONINESS	
	none to slight	
	moderate	
	excessive	
INTERPRETIVE SOIL PROPERTIES		
(4 pts)	PERMEABILITY	
	rapid	
	moderate	
	slow	
	very slow	
(4 pts)	SURFACE RUNOFF	
	rapid	
	moderate	
	slow	
	ponded	
(9 pts)	LIMITING FACTORS	
	texture	stoniness
	depth	permeability
	erosion	runoff
	slope	climate
	water table	none
(6 pts)	LAND CAPABILITY	
	class I	class V
	class II	class VI
	class III	class VII
	class IV	class VIII

FIELD CONDITIONS

- Original topsoil thickness was _____ inches
- Seasonal high water table depth _____ inches
- Soil test levels are:

_____ lbs/a N _____ lbs/a P _____ lbs/a K

- Livestock manure available (yes/no) _____
- Nutrient value of manure:

_____ lbs/a N _____ lbs/a P _____ lbs/a K

- Crop/plant to be grown _____
- Crop/plant nutrient need:

_____ lbs/a N _____ lbs/a P _____ lbs/a K

- Other considerations _____

_____

- Pay no attention to current practices on the field.
- Consider the most intensive use of the land.

PART 2: RECOMMENDED LAND TREATMENTS		
SCORE	VEGETATIVE TREATMENTS	
(14 pts)		Occasional soil conserving crop in rotation
		Frequent soil conserving crop in rotation
		Return crop residue to the soil
		Practice no-till/reduced tillage
		Establish vegetation/tree wind barriers
		Establish recommended grasses/legumes
		Use proper pasture & range management
		Establish grass waterway
(8 pts)	MECHANICAL EROSION TREATMENTS	
		None
		Diversion terraces
		Farm on the contour
		Terrace and farm on the contour
		Establish grass waterway
(8 pts)	FERTILITY TREATMENTS	
	(Y/N)	manure
	*lbs/a	nitrogen (N)
	*lbs/a	phosphorus (P)
	*lbs/a	potassium (K)

*not a check box-must enter a number

45 points	PART 1 SCORE _____
30 points	PART 2 SCORE _____
75 points	TOTAL SCORE _____

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Figure 3. **Example of a site card for SD Soil Judging competitions.**

SD LAND JUDGING COMPETITION
FIELD CONDITIONS
FIELD NUMBER 1

- Original topsoil thickness was 4 inches
- Seasonal high water table depth 12 inches
- Soil test levels are:

10 lbs/a N 16 lbs/a P 150 lbs/a K

- Livestock manure available (yes/no) Yes, cattle
- Nutrient value of manure: at 10 tons/acre rate only

50 lbs/a N 10 lbs/a P 60 lbs/a K

- Crop/plant to be grown and nutrient requirements:

If Class I/II then corn
120 lbs/a N, 60 lbs/a P, 160 lbs/a K
If Class III/IV then w. wheat
180 lbs/a N, 30 lbs/a P, 120 lbs/a K
If Class V/VI/VII then grass
50 lbs/a N, 40 lbs/a P, 130 lbs/a K

- Other considerations Overland water

- Pay no attention to practices on the field.
- Consider the most intensive use of the land.

with which a field may be used or that require special land treatments to protect the land.

Climate is a factor that also may limit the land capability class of a field. Refer to Fig. 4 to determine the effect of climate in your area.

Scoring the Land Judging Card

Participants will turn in their completed score cards before going to the next field. The contest officials will grade and tabulate the score cards. Each field will have 45 points in Part 1 and 30 points in Part 2. Point values for each property and treatment are shown on the score card.

Note to contest officials: the contest officials may determine how to weigh individual responses, including optional or alternative responses. The optional or alternative response should be of equal or lower value to the one selected by the soil scientists.

Soil Texture

Soil texture refers to the proportions of sand, silt, and clay present in a soil sample. Soil texture in combination with soil structure affects moisture-holding capacity, permeability, the capacity to hold and furnish nutrients, tilth-tillage ease, load-bearing capacity, and the erosion-hazard level of soil. In land judging, soil textures will be determined on both the topsoil and the subsoil.

Sand, silt, and clay particles have been defined as having the following diameters: sand (2-0.05 millimeter) silt (0.05-0.002 millimeter); clay (<0.002 millimeter). Soil may contain gravel (2 millimeters-3 inches) and stones greater than 3 inches (7.6 centimeters) in diameter however, soil texture is determined on materials less than 2 mm in diameter. Significant gravel content (≥ 15 %) may be considered a root limitation (see soil depth section). A field estimate of the soil texture is most easily made by moistening a soil sample, then pressing and rubbing it between the thumb and forefinger. Sand grains feel gritty and can be seen. Silt produces a floury or velvety feeling. Clay is usually sticky and plastic. When pinched between thumb and forefinger, moist clay makes long flexible ribbons exceeding one inch in length.

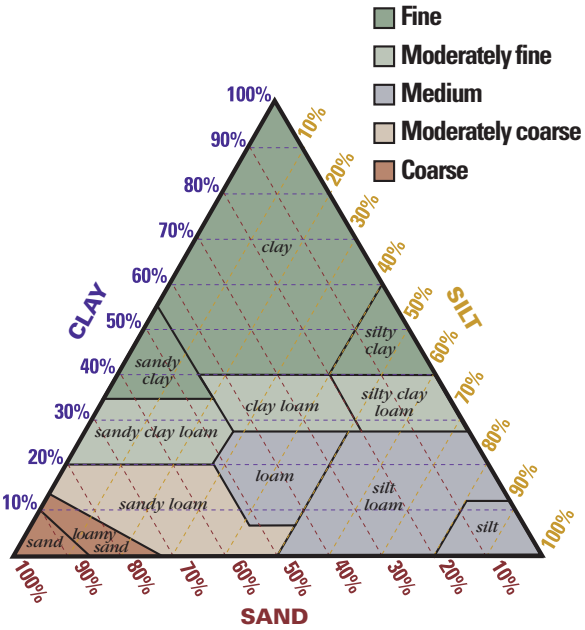
Fig. 5 shows the twelve soil textures recognized in the USDA Soil Survey Manual. These are grouped into five textural groups for land judging purposes. The sum of the percentage of sand, silt, and clay at any point in the triangle is 100.

Texture groups:

1. Coarse – sands and loamy sands. 2. Moderately coarse – sandy loams. 3. Medium – loams, silt loams, and silts. 4. Moderately fine – sandy clay loams, clay loams, and silty clay loams. 5. Fine – sandy clays, clays, and silty clays. A flow chart for placing a soil into one of the five texture groups using the "feel method" is given in Fig. 6.

Figure 4. Land capability class as affected by climate.

Figure 5. Five soil texture groups.



Coarse (limiting property)

Sands and loamy sands will not hold together. Often such soils can not retain sufficient water or plant nutrients for crop production and are subject to erosion by wind. A coarse-textured soil is gritty, loose, and single-grained. When dry soil is squeezed in the hand, it will fall apart when the pressure is released. If squeezed when moist, it will form a cast that will fall apart when touched. Coarse soils will not ribbon.

Moderately Coarse (limiting property)

This soil texture can be recognized in the field, since it is predominantly sand but has enough silt and clay to make it slightly coherent; that is, it will somewhat hold a shape. Such surface soils are sandier than desirable for ordinary field crops and many plants because of low moisture holding properties. They are subject to wind erosion.

Moderately coarse soils generally have weak structure that is easily broken. When moist, these soils can be squeezed in the hand to form a cast that will withstand careful handling without breaking. Ribbons do not form readily when moist soil is pressed between the fingers.

Medium (nonlimiting property)

This group represents a favorable mixture of sand, silt, and clay particles, neither too fine nor too coarse. It includes silt loam, loam, and silt-textured soils.

Medium-textured soils generally have moderate structure that is soft and can be easily broken when moist. When pulverized, the silts and silt loams feel soft and floury, but the loams contain enough sand to feel somewhat gritty.

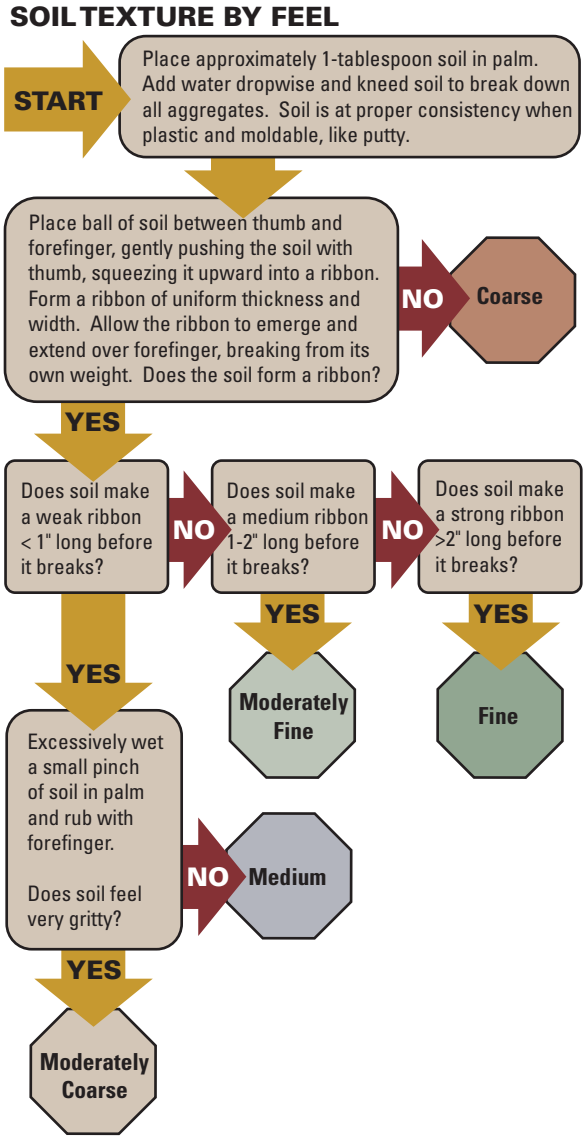
Moist, medium-textured soils, when pressed between thumb and fingers, form a short ribbon up to about one inch in length that breaks easily if shaken. If squeezed when dry, medium soils form a cast that will withstand careful handling. If a handful is squeezed when moist, it will form a cast that can be freely handled without breaking.

Moderately Fine (nonlimiting property)

This texture group includes clay loam, sandy clay loam, and silty clay loam. They are often hard when dry, firm when moist, and sticky and plastic when wet. In addition, sandy clay loams feel quite gritty, silty clay loams feel smooth, and clay loams contain some grit.

Moderately fine-textured soils easily ribbon to about one to two inches when squeezed between the fingers. The ribbon supports its own weight when shaken slightly. The moist soil is plastic and forms a hard cast when compressed.

Figure 6. A flow chart to place soil into a textural group using the feel method.



Fine (limiting property)
The fine-textured group includes sandy clay, silty clay, and clay. Fine textured soils have strong structure, but, if worked wet, will become very sticky and plastic like modeling clay.

Fine-textured soils form a flexible ribbon more than two inches long when worked out between the fingers in a moist state. The ribbon is pliable and resists breaking even when shaken. In the sandy clay ribbon, the sand is easily visible. The silty clay and clay are particularly shiny or waxy on moist ribbons and smooth cut surfaces.

Soil Depth Favorable for Plant Roots

The total thickness of soil material available for plant root growth is important in planning an agricultural or natural resource management system. Plant roots obtain water and nutrients from the root zone. A deep root zone provides a large storehouse of nutrients and water and strong mechanical support for the plant. Most plant roots respire, requiring oxygen, so air must be available.

The roots of many plants will penetrate more than 40 inches (1 meter) under normal conditions if no obstruction exists. Soils shallower than 40 inches (1 meter) limit root growth, reducing storage capacity for water and nutrients.

Examples of restrictive materials/layers are coarse sand (>1 millimeter); gravel/cobbles (>15 %) with coarse textures, sodium affected subsoil (e.g. columnar structure), and bedrock (e.g. sandstone, shale). Sodium-affected soils typically have columnar structure 6 to 14 inches (15 to 26 centimeters) from the soil surface. The color of the soil immediately above the columnar structure is generally lighter than the color in the columns. Tillage may remove the tops of the columns. In these cases, the depths to columns will be listed in "other considerations". If the depth to columns is equal to a depth break, use the least limiting group.

Soil depth favorable for plant root growth is determined by measurement of the distance from the soil surface to the limiting layer. A depth exactly on the borderline between two categories belongs to the deeper category (Table 1 and Fig. 7).
The thickness of the topsoil should also be determined from the soil profile. Most normal soils have three major horizons: (1) the topsoil, or "A" horizon; (2) the subsoil, or "B" horizon; and (3) the unconsolidated parent material, or "C" horizon. The subsurface may consist of subsoil and/or parent material. There are more horizons and subdivisions used in soil classification, but these three are concentrated on in land judging.

Soil horizons vary in texture, structure, and color. Structure and color are the key characters separating topsoil (A horizon) from subsoil (or subsurface material) in South Dakota.

Unless a restrictive layer is present, all three horizons (A, B, and C) are favorable for rooting depth.

Figure 7. Depth of root zone.

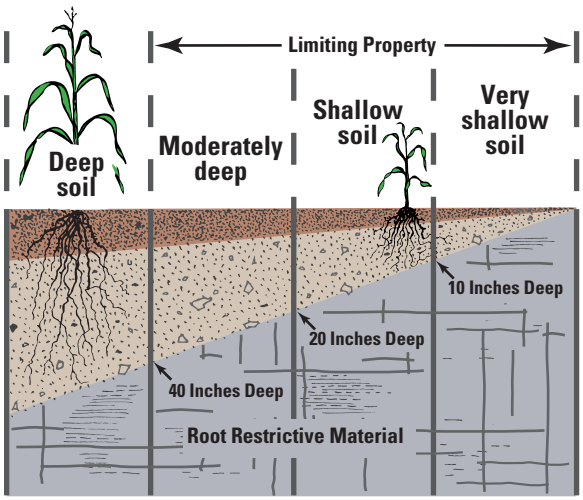


Table 1. Soil depth favorable for plant roots.

Category	Soil Depth (inches)	Property
Deep	>40	Non-Limiting
Moderately Deep	20-40	Limiting
Shallow	10-20	Limiting
Very Shallow	<10	Limiting

Past Erosion

Erosion is the loss of soil by water and wind. Under natural conditions this is usually a very gradual process. Humans, through intensive use of the land, often are responsible for the greatly accelerated soil losses that have occurred.

Many soil properties such as texture, slope, structure, and organic matter content along with plant cover and tillage have an important effect on the amount of soil that has been lost. The topsoil thickness can best be determined by examining the soil structure and soil color. The topsoil (A horizon) usually will have a granular structure or less commonly a platy structure and a very dark brown to black color. The depth of topsoil generally corresponds negatively with slope; therefore, topsoil thickness usually decreases with increasing slope.

Soil deposition may also occur by wind, water, and gravity.

The amount of past erosion that has occurred is calculated by comparing present topsoil depth with original topsoil depth given under "Field Conditions."

Erosion categories:

Deposition (non-limiting property) – Present surface soil thickness is greater than original.

None to slight (non-limiting property) – Less than 25% of the original surface soil has been removed.

Moderate (limiting property) – From 25 to 75% of the original surface soil has been removed by erosion.

Severe (limiting property) – More than 75% of the original topsoil has been removed by erosion.

Table 2. Slope categories.

Slope		
Category	Percent	Property
Depression	–	Limiting
Nearly level	0-3	Non-Limiting
Gently sloping	3-6	Limiting
Moderately sloping	6-9	Limiting
Strongly sloping	9-15	Limiting
Steep	15-25	Limiting
Very steep	>25	Limiting

Slope

Slope is the angle of inclination of the soil surface from horizontal (flat). Slope refers to the number of feet (meters) fall in each 100 feet (30 meters) of horizontal distance (Fig. 8). Slope has a tremendous effect on water runoff, erosion, and the ability to use farm machinery. Even gentle slopes (> 3%) increase the erosion potential of a field.

Any slope greater than 3% is considered a limiting factor and should be indicated on the Land Judging Score Card.

Slope categories:

Nearly level (0 to 3 %)

Gently sloping (3 to 6 %)

Moderately sloping (6 to 9 %)

Strongly sloping (9 to 15 %)

Steep (15 to 25 %)

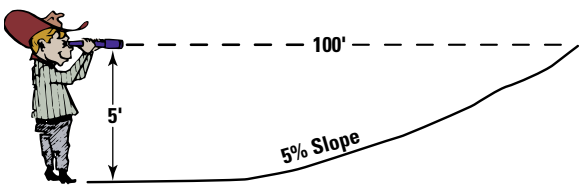
Very steep (> 25 %)

Depression (limiting property) A depression is an area with a concave or bowl-shaped slope where water and sediments from the surrounding area drains to and accumulates.

The contest field slope is determined by using the slope stakes. The slope stakes are normally 100 feet (30 meters) apart and at an equal height from the soil surface so that each foot (0.3 meter) of elevation change equals 1%. The slope stakes may, if necessary, be placed 50 feet (15 meters) apart at which time each foot (0.3 meter) of elevation must be multiplied by 2 to arrive at the slope percent. If the slope stakes are set at the alternate distance of 50 feet (15 meters), it will be announced by the contest officials and listed under "Field conditions, other considerations."

A slope that is exactly on the borderline between two categories is considered to belong to the lesser category (Table 2).

Figure 8. Shooting the slope.



Stoniness

Stoniness refers to the quantity of stones over 10 inches (25 centimeters) in diameter in or on the surface soil. Stones have an important bearing on soil use because of their interference with agricultural machinery and other uses. Be sure to evaluate the entire contest area for surface stones.

Stoniness categories:

None to slight (non-limiting property) –These fields vary from no stones to a few present but not sufficient to create appreciable tillage problems. Fields will have less than 1.5 cubic yards (1.1 cubic meters) of stones per acre foot (1,233 cubic meters). If stones are one foot (30 centimeters) in diameter and more than 30 feet (9 meters) apart there are less than 1.5 cubic yards (1.1 cubic meters) per acre foot (1,233 cubic meters).

Moderate (limiting property) – These fields have enough stones to be a nuisance during tillage operations. The stones may cause some damage to tillage equipment but do not make tillage completely impractical. Fields in this category will have from 1.5 to 50 cubic yards (1.1 to 38 cubic meters) of stones per acre foot of (1,233 cubic meters). If stones are one foot (30 centimeters) in diameter and about 5 to 30 feet (1.5 to 9 meters) apart there are about 1.5 to 50 cubic yards per acre foot (1.1 to 38 cubic meters).

Excessive (limiting property) – These fields have enough stones to make all use of machinery impractical. More than 3% of the surface is stones, which equals more than 50 cubic yards (38 cubic meters) of stones per acre foot (1,233 cubic meters). (If stones are one foot (30 centimeters) in diameter and less than 5 feet (1.5 meters) apart there are more than 50 cubic yards per acre foot (1,233 cubic meters).

Permeability (Movement of Air and Water in the Soil)

Permeability refers to the capacity of the soil to permit air and water movement through the soil profile (non-bedrock materials). Proper water-air relationships are necessary for favorable root development and normal plant growth. The subsoil or B horizon often influences water and air movement, because it usually contains more clay and/or less porous structure than the topsoil. This contest will use subsoil (subsurface material if no B horizon is present) properties to determine soil permeability.

The physical properties of texture, structure, and density largely influence the rate of air and water movement through the soil. Soil structure refers to the arrangement of the soil particles. The individual grains may be held together in aggregates of different sizes and shapes. Soils with no apparent structure are either massive or single-grain.

The principal types of structures are listed in Fig. 9. The size, shape, and stability of these soil structural units have a major influence on plant growth and offer clues to the permeability of the soil. Structure can be modified by tillage, but texture cannot be changed.

Permeability categories:

Rapid (limiting property) – These soils are coarse-textured and generally have single grain structure. Water and air move through these soils rapidly. Such soils hold less water than is desirable, causing them to be droughty.

Moderate (non-limiting property) – These soils are moderately coarse, medium, or moderately fine-textured with blocky or prismatic structured subsoils.

Slow (limiting property) – These soils are either fine-textured with blocky or prismatic structure or moderately fine-textured with columnar structure subsoils. These soils are usually sticky and plastic when wet.

Very slow (limiting property) – These soils are generally fine-textured, with columnar structure or dense clay materials. The subsoil tends to be very firm even when moist. **Root growth is generally restricted to along the faces of the structural units and along cracks.** These soils may remain wet for some period of time. They are usually sticky and plastic when wet and hard when dry.

Figure 9. **Types of soil structure and effects on permeability.**

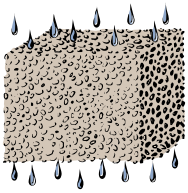
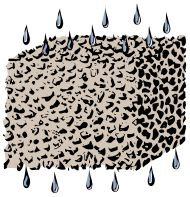
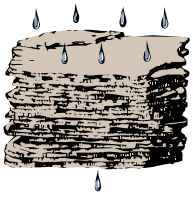
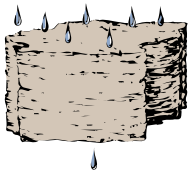
Permeability Rating:	Descriptions
Rapid 	**Single Grain** This represents a soil condition consisting of primary sand sized particles and gravels which tend to remain seperated. This type of condition is common in the more coarse textured soils, both surface and subsurface depths.
Rapid 	**Crumb or Granular** This type of structure consists of small, porous aggregates which tend to be somewhat rounded in shape. Granular aggregates form very desirable seed beds for crops and allow rapid entry of water in the soil. This type of structure is common for many surface soils in South Dakota.
Moderate to Slow 	**Blocky** This type of structure consists of aggregates clinging together in nearly square or angular blocks having sharp edges. Large blocks normally do not allow rapid entry of water in the soil. This condition is commonly found in the subsoil.
Moderate to Slow 	**Prismatic** This type of structure consists of aggregates in which the vertical faces or axes are longer than the horizonal faces or axes. The tops of the units are flat. This type of structure is common under conditions of moderate permeability and associated with the subsoil.
Slow to Very Slow 	**Columnar** This type of structure is similar to prismatic. The main difference is that the columnur units have rounded biscuit like tops. This type of structure indicates conditions of slow permeability, in fact it is an indication of a soil layer in the subsoil that is not readily penetrated by plant roots.
Slow 	**Platy** This type of structure consists of aggregates that have longer horizonal faces or axes than vertical faces or axes. The fragments are flat and thin. This type of structure is usually associated with an underlying impermeable layer of the subsoil.
Very slow 	**Massive** This represents a soil condition where there is no evidence of aggregation. The soil particles tend to stick together in no definite pattern or arrangement. This condition is usually found in the lower part of the subsoil in wet spots of the surface soil, and in compacted soil materials.

Table 3. **Surface runoff category based on slope and topsoil texture.**

Category	Topsoil Texture	
	Coarse	Other
Ponded	depression	depression
Slow	0-6%	0-3%
Moderate	6-9%	3-6%
Rapid	> 9%	> 6%

Surface Runoff

Runoff is the movement of water across the surface of the soil. It is the relative rate of water removal that is in excess of the amount that can be absorbed by soil. Runoff is affected by topsoil texture, vegetation/cover, and slope. Non-vegetated (bare) soil conditions are assumed in this contest. Use Table 3 to determine surface runoff categories.

Surface runoff categories:

Rapid (limiting property) – Water is removed from the surface at a rapid rate. A large part of the water received on these fields moves rapidly over the surface. It may run off as soon as it falls. Fields with slopes above 6% and topsoil textures finer than coarse would be in this category. Fields with a coarse-textured topsoil need a slope of greater than 9% to be in this category.

Moderate (limiting property) – Surplus water is not a problem on these fields. Water loss from the surface by runoff can reduce the supply available for plant growth. Fields with gentle slopes (3% - 6%) and topsoil textures finer than coarse would be in this category. Fields with a coarse-textured topsoil need a slope of 6% to 9% to be in this category.

Slow (non-limiting property) – Free water stands on the surface of these soils for moderate periods, usually not more than a day or two. Coarse-textured soils have slower runoff because of their rapid permeability. This increases the moisture supply but may occasionally interfere with farming operations. Most of the water received passes through the soil, is used by plants, or evaporates. Fields with slopes between 0 and 3% and topsoil textures finer than coarse would be in this category. Fields with a coarse-textured topsoil can have a slope between 0 and 6% and still be in this category.

Ponded (limiting property) – Free water stands on the surface for long periods of time, often for several days or almost continuously during wet periods. Surplus water presents a problem for most agricultural uses. Ponded soils are depressional, with concave (dish-shaped) slopes.

Depth to Water Table

Seasonal high water table depth is the depth of free water after wet periods such as snow melt or heavy rainfall. For cropland, a high water table during the growing season restricts planting and the growth of many crop plants. Wetness at anytime is damaging to a building structure in the saturated layer. Seasonal water table height is estimated by the contest officials and given under "Field Conditions." See Table 4 for the effects of seasonal water depth on land capability classification in the defined regions of the state.

Limiting Factors

Any soil property that eliminates a field from Class I capability must be marked as a limiting factor. Consider each soil property separately, and mark all which limit the land class (Table 4). The contestant must know the climate factor for the field location (Fig. 4).

Land Capability Class

If any limiting factor exists, the field is eliminated from Land Capability Class 1 (Table 5). Often, there is more than one limiting factor. Evaluate each of the limiting factors, and determine which is the most restrictive, causing the land to be placed in the highest numerical class.

The Capability Class can be no higher than the class of the most limiting soil property. **In South Dakota land judging, a combination of limitations does not place the land in a higher numerical class.** Class I-IV lands are suitable for cultivation. Class V lands are too wet for cultivation. Class VI and VII lands are suitable for grazing and forestry. Class VIII land is suited only for recreation, wildlife, and water conservation.

Table 4E. Guide to selecting Land Capability Class in Eastern South Dakota (Area 1 in Figure 4).

Soil Property	Capability Class							
	I	II	III	IV	V	VI	VII	VIII†
Climate*								
Texture: Topsoil or Subsoil	Medium, Mod. Fine	Fine, Mod. Coarse	Coarse					
Soil depth	Deep	Mod. deep		Shallow		Very Shallow		
Past erosion	None, Deposition		Moderate			Severe		
Slope	0-3%	3-6%	6-9%	9-15%	Depression	15-25%	>25%	
Stoniness	None			Moderate			Excessive	
Permeability	Moderate	Slow	Rapid	Very Slow				
Surface Runoff	Slow	Moderate	Rapid		Ponded			
Depth to Seasonal Water Table	>20"	10-20"		0-10"	Ponded			
Land Use	Crop Land				Pasture-Hayland-Wetlands			Wildlife Wetlands

*Climate is not a limiting factor in eastern South Dakota

†Class VIII; non-agricultural land; best suited for wildlife, recreation, and water conservation. Characteristics of Class VIII land generally include one or more of the following: stones less than 2 feet apart, slopes exceeding 40%, ponding for 3 months or more, and/or extremely gravelly/stony soil.

Table 4C. Guide to selecting Land Capability Class in Central and Black Hills South Dakota (Area 2 in Figure 4).

Soil Property	Capability Class							
	I	II	III	IV	V	VI	VII	VIII†
Climate	*							
Texture: Topsoil or Subsoil	Medium, Mod. Fine	Fine, Mod. Coarse	Coarse					
Soil depth	Deep		Mod. deep	Shallow		Very Shallow		
Past erosion	None, Deposition		Moderate			Severe		
Slope	0-3%	3-6%	6-9%	9-15%	Depression	15-25%	>25%	
Stoniness	None			Moderate			Excessive	
Permeability	Moderate	Slow	Rapid	Very Slow				
Surface Runoff	Slow	Moderate	Rapid		Ponded			
Depth to Seasonal Water Table	>10"			0-10"	Ponded			
Land Use	Crop Land				Pasture-Hayland-Wetlands			Wildlife Wetlands

*Due to climatic conditions in South Dakota, Class I land is not found the Central part of the state.
†Class VIII; non agricultural land; best siuted for wildlife, recreation, and water conservation. Characteristics of Class VIII land generally include one or more of the following: stones less than 2 feet apart, slopes exceeding 40%, ponding for 3 months or more, and/or extremely gravelly/stony soil.

Table 4W. Guide to selecting Land Capability Class in Western South Dakota (Area 3 in Figure 4).

Soil Property	Capability Class							
	I	II	III	IV	V	VI	VII	VIII†
Climate	*	*						
Texture: Topsoil or Subsoil	Medium, Mod. Fine	Fine, Mod. Coarse				Coarse		
Soil depth	Deep			Mod. Deep		Shallow	Very Shallow	
Past erosion	None, Deposition			Moderate		Severe		
Slope	0-3%	3-6%		6-9%	Depression	9-25%	> 25%	
Stoniness	None			Moderate			Excessive	
Permeability	Moderate	Slow		Very Slow		Rapid		
Surface Runoff	Slow	Moderate		Rapid	Ponded			
Depth to Seasonal Water Table	>10"			0-10"	Ponded			
Land Use	Crop Land				Pasture-Hayland-Wetlands			Wildlife Wetlands

*Due to climatic conditions in South Dakota, Class I and II lands are not found in the western part of the state.
†Class VIII; non agricultural land; best suited for wildlife, recreation, and water conservation. Characteristics of Class VIII land generally include one or more of the following: stones less than 2 feet apart, slopes exceeding 40%, ponding for 3 months or more, and/or extremely gravelly/stony soil.

Table 5. Land Capability Classes.

Suited for cultivation.	**Class I** Very good land; few or no limitations; can be cultivated safely with ordinary good farming practices. There are no serious climatic hazards. **Class II** Good land; moderate limitations or hazards due to land characteristic or climatic environment; can be cultivated safely with moderately intensive treatments. **Class III** Moderately good land; severe limitations or hazards due to permanent land characteristics; can be cultivated safely with intensive treatments. **Class IV** Fairly good land; very severe limitations or hazards.
Land limited in use—generally is not suited for cultivation; suited for grazing, forestry or wildlife food cover.	**Class V** Good hay or pasture land, but too wet for cultivation. Normally bottomland soils with high water tables (ponded) or subject to frequent flooding. **Class VI** Growth or utilization of vegetation moderately limited by steep land characteristics or a shallow restrictive layer; generally good to moderately good grazing lands. **Class VII** Growth or utilization of vegetation severely limited by extremely steep land characteristics, excessive stoniness, incoherent sandy soils, or very salty lowland; generally fair to poor grazing land.
Land not suited for cultivation, grazing, or forestry.	**Class VIII** Suited for wildlife, recreation, or watershed protection. Consists of semi-permanent wetlands, badlands, and saline barren lands.

Land Treatments

The Land Capability Class determines the most intensive use the field can sustain. Through proper soil management practices, land may be used at its most intensive use without degradation for an unlimited period of time. Caution: Land can never be used more intensively than its class allows without the danger of permanently lowering its productivity and future use. Humans have great influence on land through the treatments applied.

Vegetative Treatments

Use an occasional soil conserving crop in rotation

Legumes and grasses are excellent soil conserving crops. This treatment is used on Class I and II lands.

Use frequent soil conserving crops in rotation

This treatment is used on Class III and IV lands.

Return crop residue to the soil

Crop residues contain valuable nutrients and greatly improve the soil's tilth. This treatment is used on all tillable Class I-IV lands.

No-Till/Reduced Tillage

Both practices keep adequate crop residues on the surface to help protect the surface from wind and water erosion. It also aids in moisture conservation by reducing surface evaporation. This treatment is used on all tillable Class I-IV lands.

Establish vegetative/tree wind barriers

These barriers protect coarse- and moderately coarse-surface-textured soils from wind erosion. Vegetative barriers may be annual crops such as flax, corn, forage sorghum, etc. or perennials such as wheatgrasses. Any plants that reach some height create a barrier that protects the soil surface from wind. Trees, where feasible, are an excellent permanent choice. This treatment is used on Class III and IV lands with coarse or moderately coarse surface texture.

Table 6. Nutrient content of manure.

Kind of Manure		*Fertilizer Credit		
		Nitrogen (N)	Phosphorus (P)	Potassium (K)
Solid	Cattle or Hog	5	1	6
	Sheep	15	2	12
	Poultry or Turkey	25	11	8
Liquid	Dairy	25	4	26
	Beef	27	9	32
	Swine	66	11	32
	Poultry	72	22	44

*Solid manure unit is pounds of nutrient per ton of manure. Liquid manure unit is pounds of nutrient per 1,000 gallons of manure. Common application rates are 10 tons/a or 2,000 gal/a. Multiply the application rate times the nutrient content to calculate the total amount of nutrient applied.

Table 7. Crop nutrient requirements

Crop, Yield unit	*Required Nutrients (lbs/yield unit)		
	Nitrogen (N)	Phosphorus (P)	Potassium (K)
Alfalfa, ton	0	8	46
Grass, ton	25	20	66
Corn(grain), bu	1	0.5	1
Corn(silage), ton	10	7	8
Sorghum, bu	1	0.5	1
Soybean, bu	0	1	2
W. Wheat, bu	3	0.5	2
S. Wheat, bu	3	0.5	2
Canola, cwt	7	2	5
Potatoes, cwt	0.5	0.5	1
Sunflowers, cwt	5	1	4
Lawn, (1,000 sq ft)	4	1	4

*Multiply target crop/plant yield per acre by the nutrient requirement per yield unit to calculate the total crop need per acre.

Establish recommended grasses and/or legumes

Use on land not suitable for cultivation. This treatment is used on Class V, VI, and VII lands.

Use proper pasture and range management

Proper management of pasture and rangeland requires the control and timing of livestock grazing. Planned placement of livestock water and fences is required to establish uniform usage. This treatment is used on Class V, VI, and VII lands.

Mechanical Erosion Treatments

Diversion terrace

A channel with a supporting ridge on the lower side is a diversion terrace. It is built across the slope on a gentle grade. A diversion terrace intercepts water from the slope or land above and carries the water off to a safe outlet. Use with lands where overhead water or where water flowing from adjacent land is a problem. Overhead water will be listed as another consideration of "Field conditions."

Farm on the contour

Perform field operations such as tillage, planting, and cultivation on the contour or at right angles to the slope. Use on tillable lands of 3% to 6% slope.

Terrace and farm on the contour

A terrace is a channel and ridge of earth constructed across the slope approximately on the contour to intercept runoff and reduce erosion. Terraced land should be farmed parallel to the terrace. Use on tilled land with more than 6% slope.

Establish grass waterway

Establish grass waterways in drainageways where overland flowing water on tilled land is a problem. The grass waterway will protect the drainageway from erosion and from forming a gully. Overland water will be listed as an other consideration under "Field conditions."

Fertility Treatments

Manure

Livestock manure adds nutrients (Table 6) to the soil, aids in soil tilth, and improves soil quality. Apply manure to the land only if available **and** the soil test nutrient levels for nitrogen and phosphorus are below the nutrient requirements of the crop/plant to be grown (Table 7). Do not recommend the addition of excess nitrogen and phosphorus through mature and/or fertilizer application because excess N and/or excess P can be detrimental to the environment. Excess soil potassium is usually not considered an environmental risk in South Dakota. Manure should be applied to meet nitrogen and phosphorus requirements even if the manure application results in excess potassium application. If both manure and fertilizer are available preference will be given to manure application to meet plant nutrient needs.

Nitrogen (N), Phosphorus (P), and Potassium (K)

Always apply any nutrient calculated to be deficient based on soil test nutrient levels and the nutrient requirements of the plant/crop to be grown (Table 7). One or more of the nutrients may be required. Report the amount of each nutrient to be applied in pounds per acre. Be sure to take the nutrient content of manure (Table 6) into account if it is available and applied. Do not recommend the application of more nitrogen or phosphorus through manure and/or fertilizer application than needed by the crop/plant to be grown. Excess potassium is not usually considered an environmental threat. Use the *Fertility Treatments Worksheet* given in Table 8 to help in calculating fertility treatments.

An Example for Land Judging Score Card Use

Use the field conditions format to record all given information for the field. Check the contestant information, making sure all information is correct. Mark the appropriate box indicating your choice(s) for each property.

Table 8. Fertility Treatments Worksheet

		N	P	K*
A	Crop/plant nutrient requirement from contest site card (lbs/a)			
B	Soil test value from contest card (lbs/a)			
C	**Step 1:** Nutrients needed through manure, if available, and fertilizer (C=A-B) Do not apply manure if zero or negative values for N or P			
D	Nutrients in available manure at given application rate on contest site card (lbs/a) Do not apply manure if N or P content in manure is greater than value needed in C above. Enter a zero for N, P, and K if no manure is applied			
E	**Step 2:** Nutrients needed through fertilier (C-D=E) Do not apply N, P or K fertilizer (enter "0" on score card) if values are zero or negative			

*Excess K is not usually considered an environmental threat in South Dakota.

Part 1, Soil Factors

First, determine the observed soil properties such as texture, depth, erosion, slope, and stoniness. Mark the appropriate box for each property. Second, determine the interpretive soil properties.

Now that you know all factors, are there any that limit the field from qualifying as Class 1 land? The most limiting factor determines the land capability class. Mark the appropriate class.

Part 2, Recommended Land Treatment

Land management practices are based on the Land Capability Class determined in Part 1. Land treatments are divided into three areas: vegetative, mechanical, and fertility. It may be necessary to use treatments from all three areas. One or more vegetative treatments will always be used. Use Table 8 to help learn how to calculate the fertility treatments.

Glossary

Aggregate, soil. Many fine particles held in a single mass or cluster. Natural soil aggregates, such as granules, blocks, or prisms are called peds. Clods are aggregates produced by poor tillage or compaction.

Alkali (sodic) soil. A soil having so high a degree of alkalinity (pH 8.5 or higher) or so high a percentage of exchangeable sodium (15% or more of the total exchangeable bases), or both that plant growth is restricted.

Aspect. The direction in which a slope faces.

Bedrock. The solid rock that underlies the soil and other unconsolidated material or that is exposed at the Earth's surface.

Bottom land. The normal flood plain of a stream.

Boulders. Rock fragments larger than 2 feet (60 cm) in diameter.

Clay. *As a soil separate*, the mineral soil particles <.002 mm in diameter. *As a soil textural class*, soil material that is 40% or more clay, <45% sand, and <40% silt.

Claypan. A slowly permeable soil horizon that contains much more clay than the horizons above it. A claypan is commonly hard when dry and plastic to stiff when wet.

Coarse fragments. If round, mineral or rock particles 2 to >600 mm (>24 inches) in diameter; if flat, mineral or rock particles 2 to 380 mm (15 inches) long.

Cobblestone (cobble). A rounded or partly rounded fragment of rock 3 to 10 inches (7.5 to 25 cm) in diameter.

Conservation tillage. A tillage system that does not invert the soil and that leaves a protective cover of plant residue on the soil surface throughout the year.

Contour farming. Growing crops in strips that follow the contour.

Contour strip-cropping. Growing crops in strips that follow the contour. Strips of grass or close-growing crops are alternated with strips of clean-tilled crops or summer fallow.

Depth, soil. The thickness of weathered soil material over bedrock.

Diversion (or diversion terrace). A ridge of earth, generally a terrace, built to protect down slope areas by diverting runoff from its natural course.

Drainage, surface. Runoff, or surface flow of water, from an area.

Erosion. The wearing away of the land surface by wind, water, ice, or other geologic agents and by such processes as gravitational creep.

Erosion (geologic). Erosion caused by geologic processes acting over long geologic periods and resulting in the wearing away of mountains and the building up of such landscape features as flood plains. Synonym: natural erosion.

Erosion (accelerated). Erosion much more rapid than geologic erosion, mainly as a result of the activities of humans, animals, or of a catastrophe in nature, for example, a fire that exposes the soil surface.

Fallow. Cropland left idle in order to restore productivity through accumulation of moisture. Summer fallow is common in regions of limited rainfall where cereal grains are grown. The soil is tilled for at least one growing season for weed control and decomposition of organic matter.

Fertility, soil. The quality that enables a soil to provide plant nutrients, in adequate amounts and in proper balance, for the growth of specified plants when light, moisture, temperature, tilth, and other growth factors are favorable.

Fine-textured soil. Sandy clay, silty clay, and clay.

Flood plain. A nearly level alluvial plain that borders a stream and is subject to flooding unless protected artificially. It is usually a constructional landform built of sediment deposited during overflow and lateral migration of the streams.

Footslope. The inclined surface at the base of a hill.

Grassed waterway. A natural or constructed waterway, typically broad and shallow, seeded to grass as protection against erosion. Conducts surface water away from cropland.

Gravel. Rounded or angular fragments of rock as much as 3 inches (2-760 mm) in diameter. An individual piece is a pebble.

Gravelly soil material. Soil material that is 15 to 50 percent by volume, rounded or angular rock fragments, not flattened, up to 3 inches (7.6 cm) in diameter.

Groundwater. Water filling all the unblocked pores of underlying material below the water table.

Hillslope. The steeper part of a hill between its summit and the drainage line, valley flat, or depression floor at the base of the hill. In descending order, the landform positions of a simple hillslope include: summit, shoulder, backslope, footslope, and toeslope. Complex hillslopes may have two or more shoulder to toeslope sequences.

Horizon, soil. A layer of soil, approximately parallel to the surface, having distinct characteristics produced by soil-forming processes. In the identification of soil horizons, an uppercase letter represents the major horizons. Numbers or lower case letters that follow represent subdivisions of the major horizons. The major horizons are as follows:

O horizon. An organic layer of fresh and decaying plant residue.

A horizon. The mineral horizon at or near the surface in which an accumulation of humified organic matter is mixed with mineral material.

B horizon. The mineral horizon below an O, A, or E horizon. The B horizon is in part a layer of transition from the overlying horizon to the underlying C horizon. The B horizon also has distinctive characteristics, such as

(1) accumulation of clay, iron/aluminum oxides, humus, salts, or a combination of these;

(2) granular, blocky, prismatic, or columnar structure;

(3) redder or browner colors than those in the A horizon; or

(4) a combination of these.

C horizon. The mineral horizon or layer, excluding hard bedrock, that is little affected by soil-forming processes and does not have the properties typical of the overlying horizon. The material of a C horizon may be either like or unlike that in which the solum is formed. If the material is known to differ from that in the solum, an Arabic numeral, commonly a 2, precedes the letter C.

Infiltration. The downward entry of water into the immediate surface of soil or other material, as contrasted with percolation, which is the movement of water through soil layers or material.

Landscape. All natural features, such as fields, hills, forests, and water, that distinguish one part of the Earth's surface.

Loam. A soil texture that is about equally influenced by sand, silt, and clay. It does not have equal amounts of sand, silt, and clay.

Medium-textured soil. Very fine sandy loam, loam, silt, silty clay loam, sandy clay loam, and clay loam.

Minimum tillage. Only the tillage essential to crop production and prevention of soil damage (e.g. prevent wind erosion).

Neutral soil. A soil having a pH value between 6.6 and 7.3.

No-till. A conservation tillage system in which the surface is disturbed only in the immediate area of the planted seed row. The disturbed area is approximately 1 to 3 inches (3 to 8 cm) wide. Weeds are controlled primarily by herbicides.

Nutrient, plant. Any element taken in by the plant essential to its growth. Plant nutrients are mainly nitrogen, phosphorus, potassium, calcium, magnesium, sulfur, iron, manganese, copper, boron, zinc, chlorine, and molybdenum obtained form the soil and carbon, hydrogen, and oxygen obtained from the water and air.

Organic matter. Plant and animal residue in the soil in various stages of decomposition.

Overland flow. Shallow runoff water standing or flowing during or shortly after rainfall or snowmelt from adjacent or surrounding slopes.

Ped. An individual natural soil aggregate, such as a granule, a prism, or a block.

Pedon. The smallest volume that can be called "a soil". A pedon is three dimensional and large enough to permit study of all horizons. Its area ranges from about 10 to 100 square feet (1 to 10 square meters), depending on the variability of the soil.

Permeability. The quality of the soil that enables water to move downward through the profile. Permeability is measured as the number of inches per hour that water moves downward through the saturated soil.

pH value. A numerical designation of acidity and alkalinity.

Ponding. Standing water on soils in closed depressions. Unless the soils are artificially drained, the water can be removed only by percolation or evapotranspiration.

Productivity, soil. The capacity of the soil for producing a specified plant or sequence of plants under specific management.

Profile, soil. A vertical section of the soil extending through all the genetic horizons and into the parent material.

Relief. The elevations or inequalities of a land surface, considered collectively.

Ridge-till. A conservation tillage system in which seeds are planted on ridges that generally are 4 to 6 inches (10 to 15 cm) higher than the area between the rows. The surface is not disturbed prior to planting. Approximately one-third of the surface is tilled with sweeps or row cleaners at planting time. Weeds are controlled by a combination of herbicides and cultivation. Cultivation helps to rebuild the ridges.

Rock fragments. Rock or mineral fragments having a diameter of 2 mm or more (e.g. gravel, cobbles, stones, and boulders).

Root zone. The part of the soil that can be readily penetrated by plant roots.

Runoff. The precipitation discharged into stream channels from an area. The water that flows off the surface of the land without sinking into the soil is called surface runoff. Water that enters the soil before reaching surface streams is called groundwater runoff or seepage flow from groundwater.

Saline soil. A soil containing soluble salts in an amount that impairs growth of plants (EC > 4 mmhos/cm). A saline soil does not contain excess exchangeable sodium.

Sand. As a soil separate, individual rock or mineral fragments from 0.05 to 2 mm in diameter. Most sand grains consist of quartz. As a soil textural class, a soil that is 85% or more sand and not more than 10% clay.

Silt. As a soil separate, individual mineral particles that range in diameter from the upper clay limit (0.002 mm) to the lower limit of very fine sand (0.05 mm). As a soil textural class, soil that is 80% or more silt and less than 12% clay.

Slickspot. A small area of soil having a puddled, crusted, or smooth surface and an excess of exchangeable sodium. The soil is generally silty or clayey, slippery when wet, and very low in productivity.

Slope. The inclination of the land surface from the horizontal. Percent slope is the vertical distance divided by the horizontal distance, then multiplied by 100. Thus, a slope of 20% is a drop of 20 feet in 100 feet of horizontal distance.

Sodic soil. A soil containing exchangeable sodium in an amount that impairs plant growth and significantly alters soil physical and chemical properties (SAR ≥ 13).

Soil. A natural, three-dimensional body at the Earth s surface. It is capable of supporting plants and has properties resulting from the integrated effect of climate and living matter acting on earthy parent material, as conditioned by relief over periods of time.

Stones. Rock fragments 10 to 24 inches (25 to 60 cm) in diameter if rounded and 6 to 15 inches (15 to 38 cm) in length if flat.

Stony. Refers to soil containing stones in numbers that interfere with or prevent tillage.

Strip cropping. Growing crops in a systematic arrangement of strips or bands which provide vegetative barriers to wind and water erosion.

Structure, soil. The arrangement of primary soil particles into compound particles or aggregates. The principal forms of soil structure are: platy (laminated), prismatic (vertical axis longer than horizontal), columnar (prism with rounded top), blocky (angular or subangular, roughly equal dimensional), and granular. Structureless soils are either single grain (each grain by itself is a structural unit) or massive (the particles adhering without any regular cleavage, as in plowpans).

Subsoil. Technically, the B horizon; roughly, the part of the solum below plow depth.

Subsurface layer. Any surface soil horizon (A, E, AB, or EB) below the surface layer.

Surface layer. The soil ordinarily moved by tillage, or its equivalent in uncultivated soil, ranging in depth from about 4 to 10 inches (10-25 cm). Frequently designated as the "plow layer," or the "Ap horizon."

Surface soil. The A, E, AB, or EB horizons. It includes all subdivisions of these horizons.

Texture, soil. The relative proportions of sand, silt, and clay particles in a mass of soil. The basic textural classes, in order of increasing proportion of fine particles, are *sand, loamy sand, sandy loam, loam, silt loam, silt, sandy clay loam, clay loam, silty clay loam, sandy clay, silty clay, and clay.* The sand, loamy sand, and sandy loam classes may be further divided by specifying "coarse," "fine," or "very fine."

Tilth, soil. The physical condition of the soil as related to tillage, seedbed preparation, seeding emergence, compaction, and root penetration.

Topography. The relative position and elevation of the natural or man-made features of an area that describe the configuration of its surface.

Topsoil. The upper part of the soil, which is the most favorable material for plant growth. It is ordinarily rich in organic matter and is used to top-dress road banks, lawns, and land affected by mining.

Upland. Land at a higher elevation, in general, than the alluvial plain or low stream terrace; land above the lowlands along streams.

LAND JUDGING SCORE CARD

CONTESTANT NO. _____ FIELD NO. _____

NAME _____

SCHOOL/COUNTY _____

PART 1: SOIL FACTORS			
SCORE	OBSERVED SOIL PROPERTIES		
	TEXTURAL GROUP		
topsoil (4 pts)	topsoil		subsoil
		coarse	
		moderately coarse	
subsoil (4 pts)		medium	
		moderately fine	
		fine	
(3 pts)	SOIL DEPTH		
		deep (> 40")	
		moderately deep (20-40")	
		shallow (10-20")	
		very shallow (<10")	
(4 pts)	PAST EROSION		
		deposition	
		none to slight (<25%)	
		moderate (25-75%)	
		severe (>75%)	
(5 pts)	SLOPE		
		depression	
		nearly level (0-3%)	
		gently sloping (3-6%)	
		moderately sloping (6-9%)	
		strongly sloping (9-15%)	
		steep (15-25%)	
		very steep (>25%)	
(2 pts)	STONINESS		
		none to slight	
		moderate	
		excessive	
INTERPRETIVE SOIL PROPERTIES			
(4 pts)	PERMEABILITY		
		rapid	
		moderate	
		slow	
		very slow	
(4 pts)	SURFACE RUNOFF		
		rapid	
		moderate	
		slow	
		ponded	
(9 pts)	LIMITING FACTORS		
		texture	stoniness
		depth	permeability
		erosion	runoff
		slope	climate
		water table	none
(6 pts)	LAND CAPABILITY		
		class I	class V
		class II	class VI
		class III	class VII
		class IV	class VIII

FIELD CONDITIONS

- Original topsoil thickness was _____ inches
- Seasonal high water table depth _____ inches
- Soil test levels are:

_____ lbs/a N _____ lbs/a P _____ lbs/a K

- Livestock manure available (yes/no) _____
- Nutrient value of manure:

_____ lbs/a N _____ lbs/a P _____ lbs/a K

- Crop/plant to be grown _____
- Crop/plant nutrient need:

_____ lbs/a N _____ lbs/a P _____ lbs/a K

- Other considerations _____

_____

- Pay no attention to current practices on the field.
- Consider the most intensive use of the land.

PART 2: RECOMMENDED LAND TREATMENTS		
SCORE	VEGETATIVE TREATMENTS	
(14 pts)		Occasional soil conserving crop in rotation
		Frequent soil conserving crop in rotation
		Return crop residue to the soil
		Practice no-till/reduced tillage
		Establish vegetation/tree wind barriers
		Establish recommended grasses/legumes
		Use proper pasture & range management
(8 pts)	MECHANICAL EROSION TREATMENTS	
		None
		Diversion terraces
		Farm on the contour
		Terrace and farm on the contour
		Establish grass waterway
(8 pts)	FERTILITY TREATMENTS	
	(Y/N)	manure
	*lbs/a	nitrogen (N)
	*lbs/a	phosphorus (P)
	*lbs/a	potassium (K)

*not a check box-must enter a number

45 points PART 1 SCORE _____

30 points PART 2 SCORE _____

75 points TOTAL SCORE _____

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