South Dakota FFA Land & Homesite Judging Events

I. Purpose

The purpose of the Land & Homesite Judging Event is to promote soil as a basic natural resource used by humans to meet one or more of their needs.

II. Objectives

A. Land Judging
- Understand basic soil differences.
- Know how soil properties affect crop growth.
- Know how to calculate fertility needs.
- Know why soils respond differently to management practices.
- Realize the influence of land features on production and land protection.
- Select suitable soil and water conservation practices.
- Determine land capability class.
- Determine proper land uses and soil treatment.

B. Homesite Judging
- Emphasize the importance of soils and their limitations for homesites
- Predict potential problems associated with planned or existing homesites

III. Contest Setup (Land & Homesite)

A. Site Selection

1. Locate a site where different conditions can be found to judge.
   - Choose a site with a variety of slopes and/or soils if possible.
   - Choose a site suitable so the soil & slope position (landscape) correspond with each other.
2. Secure permission from the owner to use the area.
3. Probe the site to dig to be sure of soil profile.
4. Select four sites, dig pits, and prepare an official scoring key for each site, before the contest.
5. Make sure and call **South Dakota One Call (dial - 811)** to locate underground utilities **before you dig**.

B. Preparing Field Sites

1. Each site should have the same-colored flags to indicate field boundaries of the area to be judged.
2. The fields should be a minimum of 100 feet x 100 feet in size, but it ***does not*** necessarily have to be square.
3. Two well-marked stakes should be placed within the field or flagged area for contestants to use to determine slope.
   - These should be the same distance above the ground.
     - Slope stakes should be out of the ground the same distance: 3, 3½, or 4 feet.
   - The slope stakes should be laid out with the normal slope of the land.
   - They can be placed 50 or 100 feet apart but needs to be stated on the Land Judging card on Other Considerations if 50 feet slope stakes are used.
4. A trench must be dug to expose the depth of the soil profile within the flagged area.
   - The soil face (profile) should be orientated with the sun at the time of day when the contest is going to be held.
   - Dig a trench to a depth of about 48” to 60” or to the restrictive layer but ***NOT*** deeper than 60” so the sides do not slump in on students!
5. It is best to use bright colored marking paint to mark off an area in the trench as an ***“off limits area”*** that contestants use only to determine topsoil thickness and soil depth.
6. Place a tape or ruler in the “off limits area” for students to determine depths.

7. Representative topsoil and subsoil samples should be available in boxes and appropriately marked.
   - Subsoil does not have to be taken right below the topsoil as any part of the subsoil can be used to gather appropriate sample.
8. Water bottles should be available to moisten soil samples for both topsoil and subsoil.
9. A "*Field Condition*" card needs to be filled out and placed at each site.

C. Field Conditions (Land & Homesite)

1. Original Topsoil Thickness
   - Determined by the location of the pit and given a number by the landscape if on a steep slope, on a summit, shoulder, foot slope, or etc. and how much topsoil there is currently to make it fit for the past erosion.

2. Seasonal High Water Table Depth
   - Also determined by location of the pit. Look at the landscape and soil profile and determine if there has been water present.

3. Flooding Occurs____times in 100 years.
   - Also determined by location of the pit. You will not have any flooding if high on a landscape but could have some flooding on a floodplain near a channel, stream, or river area.

4. Soil Test Levels
   - Use soil test results from a producer in the area, South Dakota State University, or even ask a local agronomist what they are finding for soil fertility levels.

5. Livestock Manure Available (yes/no)
   - Make sure to only mark yes where you can get machinery or equipment to the site to apply the manure. (A realistic scenario)

6. Nutrient Value of Manure
   - Use the Land Judging in South Dakota booklet, Table 6, pg 12, to figure out manure nutrient levels.

7. Crop/plant to be grown and nutrient requirements.
   - Land Classes I-IV mark with a crop (corn, soybeans, wheat, alfalfa, etc.)
   - Land Classes V-VII mark with grass
   - Use the Land Judging in South Dakota booklet, Table 7, pg. 12, to figure out the required nutrient levels for the crop used and expecting yield.

8. Other Considerations
   - Need to write in this area if the following is applied or fits the landscape:
     Overhead Water, Overland Water, 50 ft. Slope Stakes, or Homesite Judging
   - You might have nothing written in this area if none of the mentioned is used.
   - This area could mention the color of the land judging card to be used, field number, or the flag color of the site.

D. Judging Observed Soil Properties (Land Judging)

1. Textural Groups
   - Topsoil – take soil sample from the surface area
   - Subsoil – take soil sample anywhere below the topsoil to get a representative soil texture.
   - Take soil sample from the middle of textural layer desired, not a transition area.
   - Use the flow chart in the Land Judging in South Dakota book "Soil Texture by Feel" on pg 4 of to determine texture group.

2. Soil Depth
   - Measure to the top of the restrictive layer if one is present otherwise measure to the bottom of the pit.
     - Examples of restrictive layers: claypan, shale, sandstone, gravel, and etc.
   - Make sure restrictive layer is evident and straight forward in the "off limits area" where depths are measured.
     - Example: Do not use dirty gravel as restrictive layer.
       Do not use claypan without good columns present.
   - Do NOT use a restrictive layer depth that fall right on a "soil depth" scoring break.
     - Example: Shale at 20" find profile area that is either deeper or shallower

3. Past Erosion
   - Take measurement within the "off limits area" of to determine current topsoil.
   - Measure to the bottom of the of the topsoil layer which can be determined by some or all these factors: soil color, soil structure, and soil texture.
   - Deposition is where topsoil has accumulated over time and is thicker than the original topsoil given. Only use this in appropriate areas of the landscape. (Example – potholes/depressions)
   - Take original topsoil thickness minus the current topsoil measured divided by the original topsoil thickness multiplied by 100 to find the past erosion.
   - Example:

     Step 1: 10 inches (original topsoil)
     - 7 inches (current topsoil)
     3 inches eroded away

     Step 2: 3 inches (eroded) / 10 inches (original topsoil) = .30

     Step 3: .30 X 100 = **30% erosion**

   - Do ***NOT*** put on Erosion break of 25% or 75% if needed adjust original topsoil thickness under "*Field Conditions*" to adjust percent of erosion.
   - Make sure erosion fits the landscape position and soil.
     - Example: thinner soils on a shoulder slope position on a steep slope = higher erosion potential.

4. Slope
   - Slope stakes should be at 50 or 100 feet apart.
   - Slope stakes must be placed within the flagged area or field.
   - Slope stakes should be out of the ground the same distance: 3, 3½, or 4 feet.
   - Slope stakes should be placed on the slope of the land not cross ways!
   - If 50 foot slope stakes are used then students double their finding to get proper slope percent.
   - Use a clinometer or laser level when setting up slope stakes.
   - Do ***NOT*** put Slope on the break of 3%, 6%, 9%, 12%, 15%, or 25%. Try to set contest up in the middle of a slope break.
   - If 50 foot slope stakes are used then it must be indicated on the "*Field Conditions*" under the Other Considerations.

5. Stoniness
   - Use only the surface stones not the stones from the pit to determine stoniness.
   - Stones must be within the flagged area or field to consider for stoniness.
   - Stones must be 10 inches in diameter or larger to consider for stoniness.
   - Estimated percentage but use guideline below to figure stoniness.
   - None to slight is 10 inches in diameter stones greater than 30 feet apart.
   - Moderate stoniness is 10 inches in diameter stones 5 to 30 feet apart.
   - Excessive stoniness is 3% of surface area or greater or 1 foot diameter stones less than 5 feet apart.

- Some areas within the flagged area could be excessive stoniness and others areas could have none to slight which would make it moderate stoniness.
- Reference Land Judging in South Dakota pg 7 for further questions.
- Don't make it marginal stoniness; if needed adjust field boundary to fit the desired stoniness.

E. Judging Interpretive Soil Properties (Land Judging)

1. Permeability
   - Determined by the subsoil texture in the box and the structure directly below the topsoil.
     - Example: granular topsoil goes to blocky subsoil
   - Rapid – single grain or granular structure
   - Moderate – medium or moderately fine subsoil with blocky or prismatic structure.
   - Slow – fine subsoil with blocky or prismatic structure OR moderately fine subsoil with columnar structure
   - Very Slow – fine textured with columnar structure

2. Surface Runoff
   - Determined by the percent of slope and soil texture
   - Rapid – greater than 6% slope or (coarse texture topsoil >9% slopes)
   - Moderate – 3 to 6% slope or (coarse texture topsoil 6 to 9% slopes)
   - Slow – 0 to 3% slope or (coarse texture topsoil 0 to 6% slopes)
   - Ponded – a depressional area (bowel shaped)

3. Limiting Factors
   - Any soil property listed that eliminates a field from Class I capability must be marked yes(y) otherwise mark it no(n).
   - Water Table
     - 0 to 10 inches = Land Class IV (Eastern, Central, Western, & Black Hills Areas)
     - Greater than 10" = Land Class I (Central, Western, & Black Hills Areas)
     - 10 to 20 inches = Land Class II (Eastern Area)
     - Greater than 20" = Land Class I (Eastern Area)

4. Land Capability
   - Evaluate each of the limiting factors, and determine which is the most restrictive, causing the land to be placed in the highest numerical class.
   - Look at Figure 4 pg 3 in the Land Judging in South Dakota book to determine the area: Eastern, Central, Western, or Black Hills
   - Then use Table 4E, Table 4C, or Table 4W on pgs 9 & 10 in the Land Judging in South Dakota book to determine land capability class.

F. Recommended Land Treatments (Land Judging)

1. Vegetative Treatments
   - Occasional soil conserving crop in rotation
     - mark yes if Land Capability Class I or II
   - Frequent soil conserving crop in rotation
     - mark yes if Land Capability Class III or IV
   - Return crop residue to the soil
     - mark yes if Land Capability Class I thru IV
   - Practice no-till/reduced tillage
     - mark yes if Land Capability Class I thru IV
   - Establish vegetation/tree wind barriers
     - mark yes if moderately coarse or coarse surface texture Land Capability Class III or IV
   - Establish recommended grass/legumes
     - mark yes if Land Capability Class V thru VII
   - Use proper pasture & range management
     - mark yes if Land Capability Class V thru VII

2. Mechanical Erosion Treatments
   - Diversion Terraces
     - use with lands where overhead water or where water from adjacent land is a problem
     - ***Overhead Water*** needs to be listed on "*Field Conditions*" under the Other Considerations.
     - mark yes if overhead water is listed as other considerations
   - Farm on the Contour
     - determined by Slope and Land Capability Class
     - mark yes if 3 to 6% slope and if Land Capability Class is II thru IV
   - Terrace and farm on the contour
     - determined by Slope and Land Capability Class
     - mark yes if greater than 6% slope and if Land Capability Class is III or IV
   - Establish grass waterway
     - use where overland flowing water in drainageways on Land Capability Class I thru IV is a problem
     - ***Overland Water*** needs to be listed on "*Field Conditions*" under the Other Considerations.
     - mark yes if overland water is listed as other considerations

3. Fertility Treatments
   - Determined by land class and crop to be grown from the "*Field Conditions*" under the Crop/plant to be grown and nutrient requirements.
   - Do ***NOT*** over apply Nitrogen (N) or Phosphorus (P) to the soil to protect our ground water.
   - Manure – mark yes only
     - If manure is available and the soil test nutrient levels for nitrogen and phosphorus are below the nutrient requirements of the crop/plants to be grown.
   - Nitrogen (N)
     - Use Table 8 pg 13 in the Land Judging in South Dakota book to figure fertility needs.
   - Phosphorus (P)
     - Use Table 8 pg 13 in the Land Judging in South Dakota book to figure fertility needs.
   - Potassium (K)
     - Use Table 8 pg 13 in the Land Judging in South Dakota book to figure fertility needs.

G. Land Factors – Part 1 (Homesite Judging)

1. Texture – Surface
   - Determined from the Topsoil box
   - Same texture as Land Judging

2. Permeability
   - Determined from the Subsoil box and do not need to know structure.
   - Same texture as Land Judging

3. Depth of Soil
   - Only refers to bedrock (shale, sandstone, limestone, etc)
   - Gravels and Claypans are not restrictive for homesite contest

4. Slope
   - Same as Land Judging

5. Erosion
   - Same as Land Judging

6. Surface Runoff
   - Same as Land Judging

7. Shrink-Swell
   - Determined from the Subsoil texture box
   - Low – coarse or moderately coarse texture
   - Moderate – medium or moderately fine texture
   - High – fine texture

8. Water Table
   - Use depth given on the "*Field Conditions*" Seasonal high water table depth at _ inches.

9. Flooding
   - Given on "Field Conditions" Flooding occurs _ times in a 100 years.

H. Interpretations of Limitations in Terms of: – Part 2 (Homesite Judging)

1. Refer to the Homesite Judging in South Dakota guidebook to answer interpretations.

IV. References and Resources

A. Land Judging in South Dakota, ABS 8-01, revised August 2012 with a revised Land Judging Scorecard 6/2010.

B. Homesite Judging in South Dakota, June 2008, with a revised Homesite Judging Scorecard 6/2010, guidebook revised 2015.