

**2021 State FFA Crops Contest
Management Exam**

Record your answers on the Exam section of your e-scansheet

Soybean (Questions 1-25). Mark one answer for each question.

1. The type of germination that soybean has:
 - a. Epigeal
 - b. Hypogeal
 - c. Monocot
 - d. Precocious

2. Nutrients and carbohydrates reserves are supplied to young soybean plants during emergence by the:
 - a. Radicle
 - b. Hypocotyl
 - c. Cotyledons
 - d. Unifoliate

3. The first structure to appear above the soil at the "cracking stage" during the germination of soybean is the:
 - a. Apical meristem
 - b. Hypocotyl
 - c. Cotyledons
 - d. Epicotyl

4. Soybean plants with their apical meristem damaged by hail will often regrow from:
 - a. Axillary buds
 - b. Cotyledons
 - c. Unifoliate
 - d. Internodes

5. The R4 stage of soybean growth indicates:
 - a. Full bloom
 - b. Full pod
 - c. Full seed
 - d. Full maturity

6. Drought during the R6 to R8 stages of soybean growth will decrease seed yield per acre by reducing:
 - a. The number of flowers per plant
 - b. The number of pods per plant
 - c. The number of seeds per plant
 - d. The size of the seeds

7. High night air temperatures during seed fill may decrease soybean yield by increasing:
 - a. Carbon fixation
 - b. Crassulacean acid metabolism
 - c. Light-independent reactions
 - d. Photorespiration

8. Soybean varieties grown in Minnesota are typically in maturity groups:
 - a. 00-II
 - b. III-IV
 - c. V-VI
 - d. VII-VIII

9. Soybean varieties grown in Minnesota are:
 - a. Day-neutral types
 - b. Determinate types
 - c. Indeterminate types
 - d. Long-day types

10. When compared to soybean planted in 30-inch rows, the yield advantage when soybean is planted in narrower rows is least when:
 - a. Planting early in southern Minnesota
 - b. Planting is delayed until early June
 - c. Planting at a low planting rate
 - c. Planting in northern Minnesota

11. A plant density per acre at harvest that is generally economically optimal for soybean yield is:
 - a. 35,000
 - b. 70,000
 - c. 140,000
 - d. 280,000

12. Nitrogen fixation in soybean involves a symbiotic relationship with:
 - a. Bacteria
 - b. Fungi
 - c. Microsporidia
 - d. Mycorrhizae

13. A soybean nodule is actively fixing nitrogen when the center of the nodule is:
 - a. gray to brown
 - b. green to blue
 - c. red to orange
 - d. white to yellow

14. Symptoms of potassium deficiency during the early stages of soybean growth are:
 - a. Chlorosis along the margins of the lower leaves
 - b. Chlorosis along the mid-rib of the lower leaves
 - c. Interveinal chlorosis of the upper leaves
 - d. Purple discoloration of along the margins of the lower leaves

15. The best description of iron deficiency chlorosis symptoms is:
 - a. Chlorosis on the margins of the unifoliate leaves
 - b. Interveinal chlorosis on the lower leaves
 - c. Interveinal chlorosis on the upper leaves
 - d. Purple discoloration of veins on the upper leaves

16. Which of the following is not a disease of soybean in Minnesota?
 - a. Frogeye leaf spot
 - b. Sclerotinia stem rot
 - c. Sudden death syndrome
 - d. Tan spot

17. Symptoms of white mold in soybean include:
 - a. Green to yellow mottling of young leaves
 - b. Powdery mildew on the upper surfaces of leaves
 - c. Reddish-brown lesions on the under-sides of leaves
 - d. Sclerotia

18. Bean pod mottle virus can overwinter in all but which of the following:
 - a. Bean leaf beetles
 - b. Perennial host plants
 - c. Seed that was infected by bean pod mottle virus
 - d. Soybean residue

19. The most effective way to manage soybean cyst nematode is:
 - a. Reducing tillage
 - b. Planting resistant varieties
 - c. Crop rotation
 - d. All of the above

20. Important soybean pests include all but which of the following:
 - a. Hessian flies
 - b. Japanese beetles
 - c. Leaf beetles
 - d. Spider mites

21. Soybean aphids can damage soybean plants by:
- Defoliating plants
 - Removing plant sap
 - Reducing the plant population
 - Transmitting a virus that causes purple discoloration of seed
22. The ratio of protein to oil in soybean seed is typically:
- 1:1 protein to oil
 - 1:2 protein to oil
 - 2:1 protein to oil
 - 3:1 protein to oil
23. To minimize threshing losses, soybean harvesting on a day during the harvest season typically does not begin until:
- Sunrise on a day with little wind
 - Early morning on a sunny day
 - Mid-morning on a cloudy day
 - Late morning on a sunny day
24. Harvesting soybean when grain moisture is less than 10% can:
- Reduce combine pod shattering losses
 - Reduce harvest losses associated with stem lodging
 - Reduce the germination rate of the harvested seed
 - Reduce the number of seeds that split
25. The maximum grain storage moisture for soybean when storage will be for 6 to 12 months:
- 12%
 - 15%
 - 18%
 - 21%

Wheat (Questions 26-50). Mark one answer for each question.

26. The major product of photosynthesis by wheat is:
- Carbohydrates
 - Carbon dioxide
 - Nitrogen
 - Water
27. The metabolic pathway of wheat for carbon fixation in photosynthesis:
- CAM
 - C3
 - C4
 - Symbiotic

28. The most common type of wheat planted in Minnesota is:
- Hard red spring wheat
 - Hard red winter wheat
 - Hard white spring wheat
 - Hard white winter wheat
29. Durum wheat:
- Has a lower gluten content in the grain compared to common wheat
 - Has a lower starch content in the grain compared to common wheat
 - Is awned
 - Is considered to have a soft kernel type
30. Wheat normally forms tillers, which are:
- Additional roots
 - Additional seed-producing stems
 - Additional spikes from the same stem
 - Additional projections attached to the lemma
31. At the flag leaf stage of development, wheat is nearing the end of the ___ period of growth.
- Heading
 - Maturity
 - Stem extension
 - Tillering
32. The number of tillers that form heads in wheat is determined by the ___ period of growth.
- Flowering
 - Heading
 - Stem extension
 - Tillering
33. The maximum number of kernels per spike is determined during this growth stage of wheat:
- Boot
 - Emergence
 - Heading
 - Tillering
34. At the boot stage of wheat development, the plant is near:
- Heading
 - Jointing
 - Maturity
 - Tillering

35. Assuming adequate soil moisture, wheat grain yield is greatest at which air temperature regime (in degrees Fahrenheit)?
- Highs in the 70's, lows in the 50's
 - Highs in the 80's, lows in the 60's
 - Highs in the 80's, lows in the 70's
 - Highs in the 90's, lows in the 70's
36. Grain yield of wheat is typically maximized when wheat is planted in a row spacing of:
- 6 to 8 inches
 - 12 to 15 inches
 - 20 to 22 inches
 - 28 to 30 inches
37. The recommended seeding rate per acre for wheat is about:
- 25 pounds
 - 50 pounds
 - 100 pounds
 - 200 pounds
38. Early planting is recommended for wheat because it:
- Increases the rate of emergence
 - Improves symbiotic nitrogen fixation
 - Reduces tillering
 - Can help the crop avoid high air temperature stress
39. Delaying the planting of wheat until late May often results in low grain yield because of:
- Decreased kernels per plant
 - Increased lodging
 - Low plant density
 - Poor emergence
40. Wheat grain yield is typically highest when wheat is planted after:
- Corn
 - Oat
 - Soybean
 - Wheat
41. Chlorosis of the leaf midrib of the lower leaves of wheat is a symptom of ____ deficiency.
- Nitrogen
 - Phosphorus
 - Potassium
 - Sulfur

42. Application of this nutrient has the greatest influence on grain protein content:
- Nitrogen
 - Phosphorus
 - Potassium
 - Sulfur
43. This non-chemical method can most successfully control cool season annual grassy weeds in wheat:
- Preplant tillage just before delayed planting
 - Preplant tillage just before early planting
 - An increased seeding rate
 - Interrow cultivation
44. Post-emergence herbicide applications in wheat are typically made during this period of wheat growth:
- Boot
 - Heading
 - Jointing
 - Tillering
45. Important insect pests of wheat include all but which of the following:
- Aphids
 - Cutworms
 - Leafhoppers
 - Wireworms
46. The disease of wheat that produces vomatoxin and is favored by extended periods of high moisture or high (>90%) relative humidity, coupled with moderately warm air temperatures (59 to 86 degrees Fahrenheit) just before or during flowering:
- Ergot
 - Leaf rust
 - Phomopsis
 - Scab
47. Fungicides can help control all but which of the following wheat diseases?
- Fusarium head blight
 - Leaf rust
 - Tan spot
 - Yellow dwarf virus
48. Wheat leaf rust is most commonly transmitted to wheat in Minnesota through:
- Aphids
 - Contaminated soil dispersed by equipment
 - Planting of contaminated seed
 - Wind

49. Once wheat has reached physiological maturity, its grain moisture content is approximately _____%.
- a. 13
 - b. 15.5
 - c. 32
 - d. 41
50. The most important factor influencing the value of a bushel of wheat is typically its:
- a. Oil content
 - b. Protein content
 - c. Starch content
 - d. Test weight

Insect Practicum Exam

Record your answers on the Exam 2/Team section of your e-scansheet.

All questions are worth 3 points, except questions 13 and 16, which are worth 4 points.

1. Which insect pest does not damage corn in the seedling stage?
 - a. Corn rootworm
 - b. Cutworm
 - c. White grub
 - d. Wireworm

2. Early planting of corn can help reduce injury to corn from this pest:
 - a. Bird cherry-oat aphid
 - b. Corn leaf aphids
 - c. Corn rootworm
 - d. Twospotted spider mite

3. Wireworm feeding in corn commonly occurs:
 - a. When planting is delayed
 - b. In well-drained soils
 - c. In poorly-drained soils
 - d. During the silking stage of corn

4. Feeding on corn by this insect pest can cause corn ears to fall to the ground before harvest:
 - a. Corn flea beetles
 - b. Corn rootworm
 - c. European corn borer
 - d. Wireworms

5. Which insect pest damages soybean shortly after emergence?
 - a. Bean leaf beetle
 - b. Grasshopper
 - c. Soybean aphid
 - d. Twospotted spider mite

6. Which insect pest of soybean does not chew on leaves?
 - a. Bean leaf beetle
 - b. Green cloverworm
 - c. Stink bug
 - d. Woollybear caterpillar

7. The type of damage to soybean from an insect pest with biting and chewing mouthparts:
 - a. Black mold on leaves and stems
 - b. Cupped leaves
 - c. Scarred pods
 - d. Stunted plants

8. Which widespread and prolonged weather conditions enhance the capacity of twospotted spider mites to damage soybean?
 - a. Low air temperature and low precipitation
 - b. Low air temperature and high precipitation
 - c. High air temperature and low precipitation
 - d. High air temperature and high precipitation

9. The initial damage from twospotted spider mite damage in a soybean field occurs:
 - a. In areas next to annual vegetation
 - b. In areas with low elevation
 - c. In field edges
 - d. Throughout the field

10. Factors favorable to increase in soybean aphid populations include:
 - a. Cool air temperature and drought conditions
 - b. Cool air temperature and lack of drought conditions
 - c. High air temperature and drought conditions
 - d. High air temperature and lack of drought conditions

11. Soybean aphid feeding on soybean does not lead to:
 - a. Defoliation
 - b. Honeydew on leaves
 - c. Presence of ants
 - d. Shortened plants

12. Biological control of soybean aphid cannot be achieved with:
- Asian lady beetles
 - Hessian flies
 - Parasitoids
 - Pathogens
13. Application of insecticide for control of soybean aphid once there is 100 soybean aphids per plant:
- Delays the insecticide application long enough to protect natural enemies of soybean aphid
 - Increases the likelihood of soybean aphid resurgence and the need for a subsequent insecticide application
 - Is the economic threshold for controlling soybean aphid with insecticides that is recommended by universities across the north-central United States
 - Reduces the likelihood of an uncontrollable outbreak of soybean aphid
14. The population density of this insect pest of wheat is typically greatest in growing seasons following two to three years with dry summer and fall conditions:
- Cereal leaf beetle
 - Grasshoppers
 - Thrips
 - Wheat stem sawfly
15. Injury to alfalfa from potato leafhopper appears as:
- Defoliated leaves
 - Yellow discoloration on the tips of leaves
 - Feeding scars on stems
 - Sooty mold on leaves
16. Which statement about the alfalfa weevil is false?
- It is transported into Minnesota from the southern United States by prevailing winds
 - Larvae of this pest can shred and skeletonize alfalfa leaves
 - This pest does not threaten the first harvest of alfalfa in a given year
 - Parasitic wasps and fungal pathogens may regulate populations of this pest

Soils Practicum Exam

**Record your answers in the Assessment and Solution of your e-scansheet.
Questions 1–6 are worth 3 points each. Questions 7–14 are worth 4 points each.**

For questions 1–5, use the document titled “Nonirrigated Capability Class”

1. There are _____ limitations that restrict crop production on soil represented by map unit symbol N521C2:
- Slight
 - Moderate
 - Severe
 - Very severe

2. The map unit symbol representing soils with the greatest limitations restricting crop production:
 - a. N508E
 - b. N521C2
 - c. N582B
 - d. N639F

3. The map unit symbol representing soil with the coarsest texture in the surface layer:
 - a. 590D2
 - b. N155E
 - c. N521B
 - d. N620B

4. The number of soils represented by map unit symbol N621B:
 - a. 1
 - b. 2
 - c. 3
 - d. 4

5. The map unit symbol representing soil that is better suited to pasture than corn and soybean production:
 - a. N521B
 - b. N521C2
 - c. N582B
 - d. N620B

For questions 6–10, use the document titled “Nonirrigated Capability Subclass”

6. Limitations to corn and soybean production on soil map unit symbol N582B are primarily due to:
 - a. Risk of soil erosion
 - b. Shallow, droughty, or stony soils
 - c. The soil occurring in a climate that is very cold or very dry
 - d. Water in or on the soil interfering with crop growth

7. The main difference between soils represented by map unit symbols N521B and N521C2 is:
 - a. Depth of topsoil
 - b. Frequency of flooding
 - c. Slope
 - d. Soil texture

8. The main difference between soils represented by map unit symbols 508E and 521D2 is:
 - a. The number of soils represented by the map unit symbol
 - b. Frequency of flooding
 - c. 508E is a driftless ridge
 - d. Soil texture

9. The map unit symbol representing soil that would benefit the most from terraces:
- a. N521B
 - b. N521C2
 - c. N521D2
 - d. N582B

For questions 11–14, use the document titled “Physical Soil Properties”

10. The map unit symbol representing soils with the greatest susceptibility to wind erosion:
- a. N521B
 - b. N582D2
 - c. N590D2
 - d. N1155F
11. The map unit symbol representing soil with the lowest annual rate of soil erosion that can occur without reducing crop productivity over a sustained period:
- a. N521B
 - b. N582B
 - c. N582D2
 - d. N621B
12. According to the expected value of saturated hydraulic conductivity (K_{sat}), the map unit symbol representing soil with the lowest leaching potential within the 6–20 inch soil layer:
- a. N521B
 - b. N582B
 - c. N590D2
 - d. N621B
13. The map unit symbol representing soil that can store the least amount of plant available water within the 0–24 inch soil layer:
- a. N521B
 - b. N582B
 - c. N590D2
 - d. N621B
14. The map unit symbol representing soil with the highest percentage of organic matter within the 0–6 inch soil layer:
- a. N521B
 - b. N582B
 - c. N590D2
 - d. N62

SEED ANALYSIS PRACTICUM

Base Sample:



Admixtures:



Answer the following questions about the sample. Put your answers in the "Assessment and Solution" section of the e-scansheet, numbers 16-25. 5 points per question (50 points Total) The questions are on the next page and included in the duplication materials.

Seed Analysis Questions

Answer the following questions about the sample. Put your answers in the "Assessment and Solution" section of the bubble sheet, numbers 16-25. 5 points per question (50 points Total)

16. Identify the base sample

- a. Durum wheat
- b. Hard Red Spring wheat
- c. Oats
- d. Six-rowed barley

17. How many other crops are in the sample?

- a. None
- b. One
- c. Two
- d. Three

18. An add mixture is:

- a. Buckwheat
- b. Wheat
- c. Rye
- d. None of the above

19. An add mixture is:

- a. Kentucky bluegrass
- b. Smooth brome
- c. Quackgrass
- d. Wild oat

20. An add mixture is:

- a. Hoary alyssum
- b. Velvetleaf
- c. Both of these
- d. Neither of these

21. An add mixture is:

- a. Curly dock
- b. Dandelion
- c. Wild mustard
- d. Wild buckwheat

22. An add mixture is:

- a. Birdsfoot trefoil
- b. Common lambsquarters
- c. Kochia
- d. None of the above

23. An add mixture is:

- a. Alfalfa
- b. Canada thistle
- c. Pennsylvania smartweed
- d. Shepherds purse

24. How many Restricted weeds are in the sample?

- a. None
- b. One
- c. Two
- d. Three

25. How many Prohibited weeds are in the sample?

- a. None
- b. One
- c. Two
- d. Three

GRAIN GRADING

Record your answers on the bottom section of page 2 of your e-scansheet. Below the 3 sections of ID

Official Grain Grading Form

Crops Contest:
 Grain Grading Problem #1
 Student Name _____
 Contestant Number _____
 FFA Chapter _____
 Crop: Barley

Information	Number or Percent	Grading Factor	Grade			
Sample is primarily Six-rowed barley with white aleurone layers						
Test Weight	48.0					
Moisture	12.0%					
Dockage	0.6%					
Other Factors:						
Suitable malting type	100%					
Skinned and broken kernels	3.0%					
Diseased barley	1.0%					
Barley that passes through a 5/64 x 3/4 slotted-hole sieve	8.0%					
Sprout-damaged barley	0.9%					
Wild oats	1.0%					

Final Grade:

Grading Factors:

Questions 26-33 refer to Grain Grading sample no. 1, Barley

26. The correct grade for this sample is
- 111. U.S. No. 1
 - 222. U.S. No. 2
 - 333. U.S. No. 3
 - 444. U.S. No. 4
27. How many grading factor(s) are responsible for this grade:
- 111. None – it is U.S. No. 1
 - 222. One
 - 333. Two
 - 444. Three
28. Which of the following should be contained in the complete grade designation for this sample:
- 111. Dockage %
 - 222. Moisture %
 - 333. both Dockage and Moisture %
 - 444. neither Dockage nor Moisture %
29. In this sample, the grading factor Suitable Malting type grades at
- 111. U.S. No. 1
 - 222. U.S. No. 2
 - 333. U.S. No. 3
 - 444. U.S. No. 4
30. In this sample, the grading factor Sound barley grades at
- 111. U.S. No. 1
 - 222. U.S. No. 2
 - 333. U.S. No. 3
 - 444. U.S. No. 4
31. In this sample, the grading factor Damaged kernels grades at
- 111. U.S. No. 1
 - 222. U.S. No. 2
 - 333. U.S. No. 3
 - 444. U.S. No. 4
32. In this sample, the grading factor Foreign material grades at
- 111. U.S. No. 1
 - 222. U.S. No. 2
 - 333. U.S. No. 3
 - 444. U.S. No. 4
33. In this sample, the grading factor Thin barley grades at
- 111. U.S. No. 1
 - 222. U.S. No. 2
 - 333. U.S. No. 3
 - 444. U.S. No. 4

Official Grain Grading Form

Crops Contest: Grain Grading Problem #2 Student Name _____ Contestant Number _____ FFA Chapter _____ Crop: Oat

Information	Number or Percent	Grading Factor	Grade
Sample is White Oats			
Test Weight	38.1 lbs/bu		
Moisture	12.5%		
Dockage	0.8%		
Other Factors:			
Foreign Material	1.8%		
Wild oats	1.5%		
Mold-damaged oats	1.0%		
Heat-damaged wheat	0.2%		
Ergot	0.2%		

Final Grade:

Grading Factors:

Questions 34-41 refer to Grain Grading sample no. 2, Oats

34. The correct grade for this sample is
- 111. U.S. No. 1
 - 222. U.S. No. 2
 - 333. U.S. No. 3
 - 444. U.S. No. 4
35. How many grading factor(s) are responsible for this grade:
- 111. None – it is U.S. No. 1
 - 222. One
 - 333. Two
 - 444. Three
36. Which of the following Special Grades should be designated for this sample:
- 111. Ergot
 - 222. Heavy
 - 333. Heavy and Ergoty
 - 444. No Special Grades should be designated for this sample
37. In this sample, the grading factor Test Weight per bushel grades at
- 111. U.S. No. 1
 - 222. U.S. No. 2
 - 333. U.S. No. 3
 - 444. U.S. No. 4
38. In this sample, the grading factor Sound Oats grades at
- 111. U.S. No. 1
 - 222. U.S. No. 2
 - 333. U.S. No. 3
 - 444. U.S. No. 4
39. In this sample, the grading factor Heat-Damaged Kernels grades at
- 111. U.S. No. 1
 - 222. U.S. No. 2
 - 333. U.S. No. 3
 - 444. U.S. No. 4
40. In this sample, the grading factor Foreign Material grades at
- 111. U.S. No. 1
 - 222. U.S. No. 2
 - 333. U.S. No. 3
 - 444. U.S. No. 4
41. In this sample, the grading factor Wild Oats grades at
- 111. U.S. No. 1
 - 222. U.S. No. 2
 - 333. U.S. No. 3
 - 444. U.S. No. 4

Official Grain Grading Form

Crops Contest:
 Grain Grading Problem #3
 Student Name _____
 Contestant Number _____
 FFA Chapter _____
 Crop: Soybean

Information	Number or Percent	Grading Factor	Grade		
The sample consists of more than 95% Yellow Soybean					
Test Weight	60.6				
Moisture	10.5%				
Dockage	N/A				
Other Factors:					
Splits	2.1%				
Heat-damaged soybean	0.5%				
Weather-damaged soybean	2.7%				
Foreign material	1.3				
Stones	2				

Final Grade:

Grading Factors:

Questions 42-49 refer to Grain Grading sample no. 3, Soybean

42. The correct grade for this sample is
- 111. U.S. No. 1
 - 222. U.S. No. 2
 - 333. U.S. No. 3
 - 444. U.S. No. 4
43. How many grading factor(s) are responsible for this grade:
- 111. None – it is U.S. No. 1
 - 222. One
 - 333. Two
 - 444. Three
44. If this sample had more than 10% of soybeans of other colors (not yellow) it would:
- 111. have no effect on the grade or class
 - 222. be designated as U.S. Sample grade Yellow soybeans
 - 333. be designated as U.S. No. 4 Yellow soybeans
 - 444. be designated as Mixed Soybeans and graded according to the same factors
45. In this sample, the grading factor Heat damaged kernels grades at
- 111. U.S. No. 1
 - 222. U.S. No. 2
 - 333. U.S. No. 3
 - 444. U.S. No. 4
46. In this sample, the grading factor Damaged kernels (total) grades at
- 111. U.S. No. 1
 - 222. U.S. No. 2
 - 333. U.S. No. 3
 - 444. U.S. No. 4
47. In this sample, the grading factor Foreign material grades at
- 111. U.S. No. 1
 - 222. U.S. No. 2
 - 333. U.S. No. 3
 - 444. U.S. No. 4
48. In this sample, the grading factor Splits grades at
- 111. U.S. No. 1
 - 222. U.S. No. 2
 - 333. U.S. No. 3
 - 444. U.S. No. 4
49. In this sample, the grading factor Other Materials grades at
- 111. U.S. No. 1
 - 222. U.S. No. 2
 - 333. U.S. No. 3
 - 444. U.S. No. 4

The Identification component of the CDE is in a separate PDF document.