

**2015 State FFA Crops Contest  
Management Exam**

**Name:** \_\_\_\_\_

**FFA Chapter:** \_\_\_\_\_

**Contestant No.:** \_\_\_\_\_

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

1. The first structure to appear above the soil at the "cracking stage" during the germination of soybean is:
  - a. Apical meristem
  - b. Hypocotyl
  - c. Cotyledons
  - d. Epicotyl
  
2. Nutrients and food reserves are supplied to young soybean plants during emergence by the:
  - a. Radicle
  - b. Cotyledons
  - c. Unifoliates
  - d. Trifoliates
  
3. The first true leaves on soybean are:
  - a. Cotyledons
  - b. Unifoliates
  - c. Trifoliates
  - d. Meristems
  
4. The stage of growth of soybean known as VC indicates:
  - a. Emergence
  - b. Unifoliate leaves have just unrolled
  - c. One fully developed trifoliate leaf node
  - d. One fully developed internode
  
5. Soybean plants with apical meristem damaged by hail will often regrow from:
  - a. Axillary buds
  - b. Cotyledons
  - c. Unifoliates
  - d. Internodes
  
6. The stage of growth of soybean known as R5 indicates:
  - a. Beginning bloom
  - b. Beginning pod
  - c. Beginning seed
  - d. Beginning maturity

7. Soybean has which metabolic pathway for carbon fixation in photosynthesis:
  - a. CAM
  - b. C3
  - c. C4
  - d. Symbiotic
  
8. Nitrogen fixation in soybean involves a symbiotic relationship with:
  - a. Bradyrhizobium japonicum
  - b. Fungi
  - c. Microsporidia
  - d. Mycorrhizae
  
9. Nitrogen fixation in soybean occurs in specialized root structures called:
  - a. Cotyledons
  - b. Hypocotyls
  - c. Mycorrhizae
  - d. Nodules
  
10. Soybean varieties grown in Minnesota are typically in which maturity groups:
  - a. 00-II
  - b. III-V
  - c. VI-VI
  - d. VII-IX
  
11. Soybean varieties grown in Minnesota are:
  - a. Long-day types
  - b. Day-neutral types
  - c. Determinate types
  - d. Indeterminate types
  
12. Under favorable soil conditions, soybean should generally be planted how deep:
  - a. 0.75 inches
  - b. 1.50 inches
  - c. 2.25 inches
  - d. 2.75 inches
  
13. Highest soybean yields in Minnesota typically occur when soybean is planted in:
  - a. Rows narrower than 30 inches
  - b. 30-inch rows
  - c. 36-inch rows
  - d. Any row width between 6 and 36 inches

14. Economical optimum planting rates for soybean in Minnesota are typically:
  - a. 34,000 to 36,000 seeds/acre
  - b. 75,000 to 100,000 seeds/acre
  - c. 140,000 to 160,000 seeds/acre
  - d. 225,000 to 275,000 seeds/acre
  
15. If a soybean plant density is low, soybean plants will adjust by:
  - a. Tillering
  - b. Branching
  - c. Producing fewer seeds
  - d. Producing smaller seeds
  
16. Pre-emergence mechanical weed control in a recently planted soybean crop can be achieved with a:
  - a. Mulch finisher
  - b. Field cultivator
  - c. Rotary hoe
  - d. Culti-packer
  
17. Post-emergence herbicides are applied:
  - a. To the soil before planting the crop
  - b. To the soil before the crop emerges
  - c. After the crop emerges, but before the weeds emerge
  - d. After the crop and weeds emerge
  
18. Which of the following is the best description of iron deficiency chlorosis symptoms:
  - a. Purple discoloration of veins on the upper leaves
  - b. Mottling of the trifoliolate leaves
  - c. Chlorosis on the margins of the unifoliolate leaves
  - d. Interveinal chlorosis on the trifoliolate leaves
  
19. Symptoms of white mold in soybean include:
  - a. Green to yellow mottling of young leaves
  - b. Black sclerotinia
  - c. Powdery mildew on the upper surfaces of leaves
  - d. Reddish-brown lesions on the under-sides of leaves
  
20. Which one of the following soybean diseases is reduced by the use of a crop rotation:
  - a. Pythium root rot
  - b. Cyst nematode
  - c. Powdery mildew
  - d. Mosaic virus

21. Important soybean pests include all but which of the following:
- Aphids
  - Cutworms
  - Leaf beetles
  - Spider mites
22. Which one of the following is effective at reducing soybean aphid damage:
- Crop rotation
  - Seed inoculants
  - Row width
  - Insecticidal sprays
23. High night temperatures during seed fill may decrease soybean yield by increasing:
- Respiration
  - Photosynthesis
  - Translocation
  - Diffusion
24. The hilum of soybean seed is:
- The part of the seed from which the stem forms
  - The part of the seed from which the primary root forms
  - The part of the seed attached to the pod
  - A thin covering that protects the seed's embryo
25. The protein and oil in soybean seed is typically in the ratio of:
- 1:1 protein to oil
  - 1:2 protein to oil
  - 2:1 protein to oil
  - 3:1 protein to oil

Barley (Questions 26-50). Circle one answer for each question.

26. Barley belongs to a group of crop plants known as:
- Pulses
  - Cereals
  - Oil seeds
  - Dicots
27. The two morphological types of barley are:
- Two-rowed and four-rowed
  - Two-rowed and six-rowed
  - Four-rowed and six-rowed
  - Double stack and triple stack

28. Some barley varieties can be differentiated based on their aleurone color of blue or white. The aleurone layer is part of the:
- Awns
  - Leaves
  - Seed
  - Stems
29. The threshed caryopsis (grain) of barley is covered by:
- Lemma and palea
  - Awns
  - Ligules
  - Auricles
30. The structure that protects the first leaf as it emerges through the soil during germination is the:
- Coleoptile
  - Epicotyl
  - Hypocotyl
  - Mesocotyl
31. Barley has a root system described as:
- Tap
  - Branched
  - Fibrous
  - Seminal
32. Barley forms tillers which are:
- Additional seed-producing stems
  - Additional roots
  - Multiple spikes from the same stem
  - Needle-like projections attached to the lemma
33. At the "boot" stage of development a barley plant is near:
- Heading
  - Maturity
  - Soft dough
  - Tillering
34. The two main end-use classifications of barley in Minnesota are:
- Feed and malting
  - Feed and oil
  - Feed and sucrose
  - Feed and fiber

35. The largest concentration of barley acreage in Minnesota is in what region of the state:
- East Central
  - Northeastern
  - Northwestern
  - Southeastern
36. Early planting is recommended for barley because it:
- Can help the crop avoid stress from high air temperatures
  - Results in quicker emergence
  - Reduces the potential for early-season phosphorus deficiency
  - Reduces tillering
37. The recommended seeding rate of barley per acre is about:
- 10 pounds
  - 45 pounds
  - 85 pounds
  - 135 pounds
38. Barley is usually planted in a row spacing of:
- 6 to 7 inches
  - 20 to 22 inches
  - 30 inches
  - 36 inches
39. The normal planting depth of barley in inches is:
- 0.75
  - 1.5
  - 2.5
  - 3.5
40. Farmers must be careful not to over fertilize barley with \_\_\_\_\_ because it can increase lodging and grain protein content which are both undesirable.
- Iron
  - Sulfur
  - Phosphorus
  - Nitrogen
41. Yellowing from the leaf tip down the leaf midrib and ultimate death of the lower leaves of barley is a symptom of a deficiency of what nutrient:
- Nitrogen
  - Phosphorus
  - Potassium
  - Sulfur

42. The type of weeds most difficult to control in a growing crop of barley:
- Perennial broadleaf weeds
  - Annual broadleaf weed
  - Glyphosate-resistant weeds
  - Annual grass weeds
43. Cool-season grassy weeds such as wild oats can best be controlled by which non-chemical method:
- Cultivation
  - Early planting
  - Delayed planting
  - Increased seeding rate
44. One of the major diseases of barley is:
- Phytophthora root rot
  - Fusarium head blight
  - Cyst nematode
  - White mold
45. Seed treatment before planting is effective for the control of which barley disease:
- Barley yellow dwarf virus
  - Leaf blight
  - Loose smut
  - Stem rust
46. In the field, barley grain is considered physiologically mature when:
- The upper internode supporting the head has lost all green color
  - The upper leaves are beginning to turn yellow to brown
  - All leaves have fallen off the plant
  - The entire plant is brown
47. Barley harvest can make you itch because of its rachilla hairs. The rachilla is attached to the:
- Awns
  - Leaves
  - Seed
  - Stems
48. Malting barley must have low values of the following:
- Grain plumpness
  - Seed size
  - Test weight
  - Vomitoxin

49. Maximum moisture content for safe storage of barley grain is:

- a. 9.5%
- b. 13.0%
- c. 15.5%
- d. 18.0%

50. Barley is a self-pollinated crop; consequently, seed saved from the crop will be genetically \_\_\_\_\_ to the variety planted.

- a. Different
- b. Identical
- c. Intermediate between the two parents
- d. Segregating for various plant traits



**2015 State FFA Crops Contest  
Soils Practicum Exam**

**Name:** \_\_\_\_\_

**FFA Chapter:** \_\_\_\_\_

**Contestant No.:** \_\_\_\_\_

**Circle one answer for each question. All questions are worth 4 points, except questions 8 and 9 which are worth 5 points each.**

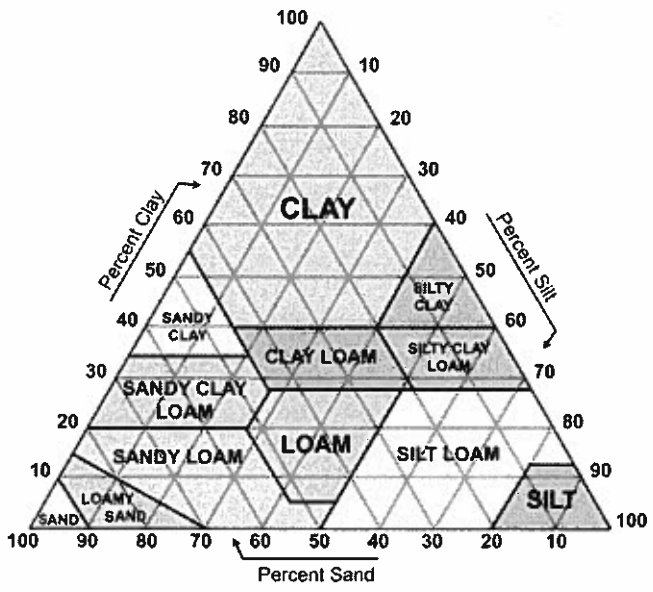
**For Questions 1-10, use the provided document titled “Nonirrigated Yields by Map Unit--- Nicollet County, Minnesota”**

1. There are \_\_\_\_\_ limitations that restrict crop production on Canisteo clay loam soil (map unit symbol 86).
  - a. Slight
  - b. Moderate
  - c. Severe
  - d. Very severe
  
2. The map unit symbol representing soil with the fewest limitations restricting crop production:
  - a. 86
  - b. 106B
  - c. 106C2
  - d. 118
  
3. Limitations to corn and soybean production on a Clarion-Storden complex, 2 to 6 percent slopes (soil map unit symbol 921B) are primarily due to:
  - a. Risk of erosion
  - b. Water in or on the soil interfering with crop growth
  - c. Shallow soil
  - d. The soil occurring in a climate that is very cold or very dry
  
4. The main difference between soils represented by map unit symbols 106B and 106C2 is:
  - a. Depth to bedrock
  - b. Internal drainage
  - c. Slope
  - d. Soil texture
  
5. The number of soils represented by map unit symbol 920C2:
  - a. 1
  - b. 2
  - c. 3
  - d. 4

6. The map unit symbol representing soil that would benefit the most from conservation tillage:
  - a. 86
  - b. 109
  - c. 118
  - d. 921B
  
7. The map unit symbol representing soil that would likely show the greatest improvement in corn and soybean yields with the addition of artificial drainage:
  - a. L84A
  - b. 94B
  - c. 106B
  - d. 118
  
8. The map unit symbol representing soil with the finest texture:
  - a. 86
  - b. 102B
  - c. 106B
  - d. 118
  
9. The map unit symbol representing soil that could be described as peat:
  - a. L13A
  - b. 86
  - c. 112
  - d. 920B
  
10. The map unit symbol representing soil that is better suited to wildlife habitat than crop production:
  - a. 920B
  - b. 921C2
  - c. 960D2
  - d. 1075

For questions 11-12, refer to the soil textural triangle on the following page:

11. A soil with 60% silt and 20% clay would be classified as:
  - a. Loam
  - b. Silt loam
  - c. Silty clay loam
  - d. Clay loam
  
12. The soil textural class that holds the least amount of plant-available water:
  - a. Loamy sand
  - b. Sandy loam
  - c. Sandy clay loam
  - d. Sandy clay



## Nonirrigated Yields by Map Unit

The average yields per acre that can be expected of the principal crops under a high level of management are shown in this table. In any given year, yields may be higher or lower than those indicated in the table because of variations in rainfall and other climatic factors.

The yields are based mainly on the experience and records of farmers, conservationists, and extension agents. Available yield data from nearby counties and results of field trials and demonstrations also are considered.

The management needed to obtain the indicated yields of the various crops depends on the kind of soil and the crop. Management can include drainage, erosion control, and protection from flooding; the proper planting and seeding rates; suitable high-yielding crop varieties; appropriate and timely tillage; control of weeds, plant diseases, and harmful insects; favorable soil reaction and optimum levels of nitrogen, phosphorus, potassium, and trace elements for each crop; effective use of crop residue, barnyard manure, and green manure crops; and harvesting that ensures the smallest possible loss.

If yields of irrigated crops are given, it is assumed that the irrigation system is adapted to the soils and to the crops grown, that good-quality irrigation water is uniformly applied as needed, and that tillage is kept to a minimum.

Pasture yields are expressed in terms of animal unit months. An animal unit month (AUM) is the amount of forage required by one mature cow of approximately 1,000 pounds weight, with or without a calf, for 1 month.

The estimated yields reflect the productive capacity of each soil for each of the principal crops. Yields are likely to increase as new production technology is developed. The productivity of a given soil compared with that of other soils, however, is not likely to change.

Crops other than those shown in the table are grown in the survey area, but estimated yields are not listed because the acreage of such crops is small. The local office of the Natural Resources Conservation Service or of the Cooperative Extension Service can provide information about the management and productivity of the soils for those crops.

The land capability classification of map units in the survey area is shown in this table. This classification shows, in a general way, the suitability of soils for most kinds of field crops (United States Department of Agriculture, Soil Conservation Service, 1961). Crops that require special management are excluded. The soils are grouped according to their limitations for field crops, the risk of damage if they are used for crops, and the way they respond to management. The criteria used in grouping the soils do not include major and generally expensive landforming that would change slope, depth, or other characteristics of the soils, nor do they include possible but unlikely major reclamation projects. Capability classification is not a substitute for interpretations designed to show suitability and limitations of groups of soils for rangeland, for forestland, or for engineering purposes.

In the capability system, soils are generally grouped at three levels: capability class, subclass, and unit.

*Capability classes*, the broadest groups, are designated by the numbers 1 through 8. The numbers indicate progressively greater limitations and narrower choices for practical use. The classes are defined as follows:

- Class 1 soils have slight limitations that restrict their use.
- Class 2 soils have moderate limitations that restrict the choice of plants or that require moderate conservation practices.
- Class 3 soils have severe limitations that restrict the choice of plants or that require special conservation practices, or both.
- Class 4 soils have very severe limitations that restrict the choice of plants or that require very careful management, or both.
- Class 5 soils are subject to little or no erosion but have other limitations, impractical to remove, that restrict their use mainly to pasture, rangeland, forestland, or wildlife habitat.
- Class 6 soils have severe limitations that make them generally unsuitable for cultivation and that restrict their use mainly to pasture, rangeland, forestland, or wildlife habitat.
- Class 7 soils have very severe limitations that make them unsuitable for cultivation and that restrict their use mainly to grazing, forestland, or wildlife habitat.
- Class 8 soils and miscellaneous areas have limitations that preclude commercial plant production and that restrict their use to recreational purposes, wildlife habitat, watershed, or esthetic purposes.

*Capability subclasses* are soil groups within one class. They are designated by adding a small letter, *e*, *w*, *s*, or *c*, to the class numeral, for example, 2e. The letter *e* shows that the main hazard is the risk of erosion unless close-growing plant cover is maintained; *w* shows that water in or on the soil interferes with plant growth or cultivation (in some soils the wetness can be partly corrected by artificial drainage); *s* shows that the soil is limited mainly because it is shallow, droughty, or stony; and *c*, used in only some parts of the United States, shows that the chief limitation is climate that is very cold or very dry.

In class 1 there are no subclasses because the soils of this class have few limitations. Class 5 contains only the subclasses indicated by *w*, *s*, or *c* because the soils in class 5 are subject to little or no erosion.

*Capability units* are soil groups within a subclass. The soils in a capability unit are enough alike to be suited to the same crops and pasture plants, to require similar management, and to have similar productivity. Capability units are generally designated by adding an Arabic numeral to the subclass symbol, for example, 2e-4 and 3e-6. These units are not given in all soil surveys.

Reference:

United States Department of Agriculture, Soil Conservation Service. 1961. Land capability classification. U.S. Department of Agriculture Handbook 210.

## Report—Nonirrigated Yields by Map Unit

Nonirrigated Yields by Map Unit—Nicollet County, Minnesota

Nonirrigated Yields by Map Unit—Nicollet County, Minnesota			
Map symbol and soil name	Land capability	Corn	Soybeans
		<i>Bu</i>	<i>Bu</i>
86—Canisteo clay loam		184	51
Canisteo	2w		
94B—Terril loam, 1 to 6 percent slopes		196	54
Terril	2e		
102B—Clarion loam, 2 to 6 percent slopes		—	—
Clarion	2e		
106B—Lester loam, 2 to 6 percent slopes		—	—
Lester	2e		
106C2—Lester loam, 6 to 10 percent slopes, moderately eroded		—	—
Lester, moderately eroded	3e		
109—Cordova clay loam		172	48
Cordova	2w		
112—Harps clay loam, 0 to 2 percent slopes		—	—
Harps	2w		
118—Crippin loam		198	55
Crippin	1		
239—Le Sueur clay loam		194	54
Le sueur	1		
336—Delft clay loam		186	52
Delft	2w		
386—Okoboji mucky silty clay loam		170	47
Okoboji	3w		
525—Muskego soils, 0 to 1 percent slopes		—	—
Muskego, drained Muskego, ponded	3w 8w		
920B—Clarion-Storden-Hawick complex, 2 to 6 percent slopes		142	39
Clarion Hawick Storden	2e 4s 2e		
920C2—Clarion-Storden-Hawick complex, 6 to 12 percent slopes, eroded		133	37
Clarion, eroded Hawick, eroded Storden, eroded	3e 4s 3e		
921B—Clarion-Storden complex, 2 to 6 percent slopes		180	50



Nonirrigated Yields by Map Unit--Nicollet County, Minnesota			
Map symbol and soil name	Land capability	Corn	Soybeans
		<i>Bu</i>	<i>Bu</i>
Clarion Storden	2e 2e		
921C2—Clarion-Storden complex, 6 to 12 percent slopes, eroded		172	48
Clarion, eroded Storden, eroded	3e 3e		
960D2—Storden-Clarion complex, 12 to 18 percent slopes, eroded		131	36
Storden, eroded Clarion, eroded	4e 4e		
1075—Klossner and Muskego soils, ponded		—	—
Klossner, ponded Muskego, ponded	8w 8w		
1901B—Le Sueur-Lester complex, 1 to 6 percent slopes		192	53
Le sueur Lester	1 2e		
L13A—Klossner muck, 0 to 1 percent slopes		—	—
Klossner, drained	3w		
L83A—Webster clay loam, 0 to 2 percent slopes		—	—
Webster	2w		
L84A—Glencoe clay loam, depressional, 0 to 1 percent slopes		170	47
Glencoe, depressional	3w		
L85A—Nicollet clay loam, 1 to 3 percent slopes		—	—
Nicollet	1		
L107A—Canisteo-Glencoe, depressional complex, 0 to 2 percent slopes		180	50
Canisteo Glencoe, depressional	2w 3w		
W—Water		—	—
Water	—		

### Data Source Information

Soil Survey Area: Nicollet County, Minnesota  
 Survey Area Data: Version 10, Sep 16, 2014

**2015 State FFA Crops Contest  
Insect Practicum Exam**

Name: \_\_\_\_\_

FFA Chapter: \_\_\_\_\_

Contestant No.: \_\_\_\_\_

**Circle one answer for each question. All questions are worth 3 points, except questions 3 and 6 which are worth 4 points each.**

1. An insect pest of a given crop is any insect species that:
  - a. Is present in the crop field
  - b. Is present in the crop field at economic threshold levels
  - c. Feeds on the crop and competes with producers for crop yield or quality
  - d. Requires regular expenditures for control
  
2. Insects pests of stored grain are more likely to present problems under which conditions
  - a. High temperature and high moisture
  - b. High temperature and low moisture
  - c. Low temperature and high moisture
  - d. Low temperature and low moisture
  
3. A guiding principle of a comprehensive insect pest management program is timely field scouting, followed by insecticide use:
  - a. Before the density of the insect pest has reached the economic threshold
  - b. If the density of the insect pest has exceeded the economic threshold
  - c. As soon as the insect is first observed in the field
  - d. If there is evidence that the economic threshold will be reached if an insecticide treatment is not applied soon
  
4. Which insect pest of alfalfa does not have piercing and sucking mouth parts:
  - a. Alfalfa weevil
  - b. Cowpea aphid
  - b. Potato leafhopper
  - c. Spittlebug
  
5. Which statement about the potato leafhopper is false:
  - a. Some grandular-haired alfalfa varieties are resistant to this pest
  - b. This pest typically does not threaten the first harvest of alfalfa in a given year
  - c. This pest can overwinter in Minnesota
  - d. Several generations of this pest appear throughout the growing season



6. Which statement about the alfalfa weevil is false:
  - a. They are transported into Minnesota from the southern United States by prevailing winds
  - b. Typically, this pest only threatens the second through fourth harvests of alfalfa in a given year
  - c. Larvae of this pest can shred and skeletonize alfalfa leaves
  - d. Parasitic wasps and fungal pathogens may regulate populations of this pest
  
7. Which insect pest does not damage corn shortly after emergence:
  - a. Corn rootworm larvae
  - b. Cutworm
  - c. White grub
  - d. Wireworm
  
8. Which insect pest does not feed on below-ground parts of corn:
  - a. Corn rootworm larvae
  - b. European corn borer
  - c. Slugs
  - d. Wireworm
  
9. Which insect pest does not chew on leaves and/or stems of corn:
  - a. Corn rootworm adults
  - b. Corn earworm
  - c. Cutworm
  - d. White grub
  
10. Which insect pest of corn does not have piercing and sucking mouth parts:
  - a. Bird cherry-oat aphid
  - b. Japanese beetle
  - c. Stink bug
  - d. Twospotted spider mite
  
11. Bt corn hybrids are unable to provide control of which insect pest:
  - a. Black cutworm
  - b. Corn rootworm
  - c. European corn borer
  - d. Japanese beetle
  
12. Which insect pest damages soybean shortly after emergence:
  - a. Bean leaf beetle
  - b. Grasshopper
  - c. Soybean aphid
  - d. Twospotted spider mite

13. Which insect pest does not chew on soybean leaves:
- Bean leaf beetle
  - Green cloverworm
  - Stink bug
  - Woollybear caterpillar
14. Damage to soybean plants by soybean aphid does not include:
- Crinkled and cupped leaves
  - Feeding scars on pods
  - Stunting
  - Sooty mold on leaves and stems
15. Biological control of soybean aphid cannot be achieved with:
- Asian lady beetles
  - Parasitoids
  - Pathogens
  - Twospotted spider mites
16. The economic threshold guideline from university extension services in the north-central United States for controlling soybean aphid with insecticides is:
- 50 aphids per plant
  - 125 aphids per plant
  - 250 aphids per plant
  - 500 aphids per plant

## 2015 CROPS EXAM KEYS --

### SOYBEANS AND BARLEY

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

### SOILS PRACTICUM KEY

- |      |       |
|------|-------|
| 1. B | 7. A  |
| 2. D | 8. A  |
| 3. A | 9. A  |
| 4. C | 10. D |
| 5. C | 11. B |
| 6. D | 12. A |

### INSECT PRACTICUM KEY

- |      |       |
|------|-------|
| 1. C | 9. D  |
| 2. A | 10. B |
| 3. B | 11. D |
| 4. A | 12. A |
| 5. C | 13. C |
| 6. B | 14. B |
| 7. A | 15. D |
| 8. B | 16. C |