

# Nebraska Certified Crop Advisor Practice Test (Sample)

## Study Guide



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## **Questions**

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- 1. What is a limitation associated with seed treatment?**
  - A. Effectiveness on all seed types**
  - B. Cost**
  - C. Environmental impact**
  - D. Seed viability**
- 2. Which compound can be found in the air at levels that can damage crops?**
  - A. Ozone**
  - B. Carbon Dioxide**
  - C. PAN**
  - D. Sulfur Dioxide**
- 3. Which condition is NOT favorable for seed germination?**
  - A. High moisture**
  - B. Balanced temperature**
  - C. Dry soil**
  - D. Sufficient oxygen**
- 4. \_\_\_\_\_ is considered better than \_\_\_\_\_ for incorporating broadcast fertilizers.**
  - A. Plowing, Disking**
  - B. Disking, Plowing**
  - C. Tilling, Plowing**
  - D. Spreading, Plowing**
- 5. At which soil pH would phosphorus be most available for plant uptake?**
  - A. 5.5**
  - B. 6.0**
  - C. 6.8**
  - D. 7.5**

- 6. Which of the following is not a contribution of soil organic matter to soil properties?**
- A. Improved soil structure**
  - B. Increased water-holding capacity**
  - C. Increased Molybdenum availability**
  - D. Enhanced nutrient retention**
- 7. Which characteristic typically indicates a pesticide's potential to leach into groundwater?**
- A. Solubility in Water**
  - B. Persistence in Soil**
  - C. Formulation Type**
  - D. Application Method**
- 8. Using cover crops primarily helps to improve what aspect of farming?**
- A. Soil Erosion**
  - B. Soil Structure**
  - C. Labor Costs**
  - D. Crop Pricing**
- 9. How does the optimum temperature for crop growth and development change?**
- A. It remains constant throughout**
  - B. It increases with crop age**
  - C. It changes with crop growth stage**
  - D. It decreases in hotter climates**
- 10. What site characteristic increases the potential for soil and water pollution by a pesticide?**
- A. Low Erosion**
  - B. High Erosion**
  - C. Good Drainage**
  - D. Rich Organic Matter**

## **Answers**

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1. B
2. C
3. C
4. A
5. C
6. C
7. A
8. B
9. C
10. B

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## **Explanations**

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## 1. What is a limitation associated with seed treatment?

- A. Effectiveness on all seed types
- B. Cost**
- C. Environmental impact
- D. Seed viability

Cost is a significant limitation associated with seed treatment because the application of chemical or biological treatments can be expensive. This cost includes not only the price of the treatment products themselves but also the expenses related to application and the potential need for specialized equipment or labor. Farmers need to weigh these costs against the expected benefits, such as increased crop yield or reduced disease incidence, to make informed decisions. While effectiveness on all seed types, environmental impacts, and seed viability are important considerations, they can vary widely based on specific situations and types of treatments used. For example, some treatments may not perform well on certain seed types, or they may have varying environmental impacts depending on usage and local regulations. Seed viability can also be influenced by treatment, although many treatments are designed to protect and enhance viability. However, the immediate and often more measurable concern for many producers is the initial investment required for seed treatments, making cost a clear limitation in overall agricultural practice decisions.

## 2. Which compound can be found in the air at levels that can damage crops?

- A. Ozone
- B. Carbon Dioxide
- C. PAN**
- D. Sulfur Dioxide

The compound known to be present in the air at damaging levels for crops is PAN, or Peroxyacyl Nitrate. PAN is a secondary air pollutant formed from the reaction of volatile organic compounds (VOCs) and nitrogen oxides (NOx) in the presence of sunlight. It can adversely affect plant health by causing leaf injury, impacting photosynthesis, and leading to reduced crop yields. Ozone, while harmful to crops, is typically considered in the context of direct exposure as a primary pollutant rather than a secondary one like PAN. Carbon dioxide, although crucial for plant growth, is not considered damaging at current ambient levels, and high levels of sulfur dioxide can have harmful effects; however, it is less ubiquitous compared to PAN in certain environments when analyzing crop damage specifically linked to secondary air pollutants. In summary, PAN is particularly notable for its crop-damaging potential as a secondary pollutant and is indicative of urban air pollution scenarios, thus making it the correct choice in the context of the question.

**3. Which condition is NOT favorable for seed germination?**

- A. High moisture**
- B. Balanced temperature**
- C. Dry soil**
- D. Sufficient oxygen**

For seed germination to occur successfully, specific environmental conditions must be met. High moisture is crucial as seeds typically need sufficient water to hydrate and activate the metabolic processes necessary for germination. Balanced temperature ensures that the seeds are within an optimal range to promote growth without causing stress or dormancy. Sufficient oxygen is also vital, as seeds require oxygen for respiration during the germination process. Dry soil presents a major challenge for seed germination. Without adequate moisture, seeds cannot absorb the water they need to begin the germination process, leading to a lack of metabolic activity and, ultimately, failure to sprout. Therefore, dry soil is not a favorable condition for germination, making it the correct choice in this context.

**4. \_\_\_\_\_ is considered better than \_\_\_\_\_ for incorporating broadcast fertilizers.**

- A. Plowing, Disking**
- B. Disking, Plowing**
- C. Tilling, Plowing**
- D. Spreading, Plowing**

The choice indicating that plowing is considered better than disking for incorporating broadcast fertilizers is accurate because plowing typically provides a deeper and more thorough incorporation of the fertilizer into the soil. This deeper incorporation ensures that the nutrients are more effectively integrated into the root zone where they can be accessed by plants. Plowing turns the soil over, which allows for better mixing and can help to maintain soil structure and porosity. It also helps to break up compacted layers and incorporates organic matter, which can enhance soil fertility and improve nutrient uptake. On the other hand, disking is generally used for shallower soil mixing and may not achieve the same level of incorporation as plowing. While disking can be faster and require less energy, its effectiveness at integrating fertilizers, especially at a greater depth, is less than that of plowing. Therefore, the distinction between the two methods is based on how well they incorporate fertilizers into the soil profile, making plowing the preferred choice in this context.

**5. At which soil pH would phosphorus be most available for plant uptake?**

**A. 5.5**

**B. 6.0**

**C. 6.8**

**D. 7.5**

Phosphorus availability to plants is influenced significantly by soil pH. In general, the optimal soil pH range for phosphorus availability is between 6.0 and 7.0. Within this range, phosphorus is primarily present in forms that are easily accessible to plants. At a pH of around 6.8, phosphorus is most likely to be soluble and available for plant uptake due to the balance between the solubility of phosphate ions and their tendency to form compounds with other elements in the soil. When the pH is lower, as in the case of pH 5.5, phosphorus can bind more readily with aluminum and iron oxides, making it less available to plants. Conversely, at higher pH levels, such as 7.5, phosphorus can become tied up with calcium, again reducing its availability. Thus, a soil pH of 6.8 represents a sweet spot where phosphorus is maximally available for plant uptake, enabling better nutrient absorption and supporting healthy crop growth.

**6. Which of the following is not a contribution of soil organic matter to soil properties?**

**A. Improved soil structure**

**B. Increased water-holding capacity**

**C. Increased Molybdenum availability**

**D. Enhanced nutrient retention**

Soil organic matter plays a crucial role in enhancing various soil properties, contributing significantly to soil health and productivity. One key aspect of soil organic matter is its ability to improve soil structure. This is achieved as organic matter helps bind soil particles together, creating aggregates that enhance porosity and aeration. Additionally, soil organic matter increases the water-holding capacity of soil by improving the soil's ability to retain moisture, which is vital for plant growth and sustainability. The presence of organic matter helps to create more pore spaces in the soil, allowing it to hold water better after rainfall or irrigation. Furthermore, organic matter enhances nutrient retention by acting like a sponge, effectively holding onto nutrients and preventing them from leaching away, thereby making them available for plant uptake over time. In contrast, the availability of micronutrients such as molybdenum is not directly improved by soil organic matter. While organic matter can influence the overall nutrient dynamics in the soil, molybdenum availability is primarily affected by soil pH, moisture content, and the chemical form of molybdenum present, rather than by the organic matter itself. This is why the option regarding increased molybdenum availability is not considered a contribution of soil organic matter to soil properties.

**7. Which characteristic typically indicates a pesticide's potential to leach into groundwater?**

**A. Solubility in Water**

**B. Persistence in Soil**

**C. Formulation Type**

**D. Application Method**

The characteristic that indicates a pesticide's potential to leach into groundwater is its solubility in water. Pesticides that are highly soluble can easily dissolve in water and, therefore, have a higher likelihood of moving with water through the soil profile. When rain or irrigation occurs, these soluble pesticides can be transported downward and potentially reach groundwater sources. In contrast, while persistence in soil can influence how long a pesticide remains active in the environment, it does not directly determine its capacity to leach. Formulation type may affect the pesticide's application, efficacy, and environmental impact, but it is not a direct indicator of leaching potential. Application method might influence the immediate area of concentration or runoff, but solubility is the key factor that relates to a pesticide's mobility in water and, consequently, its likelihood of contaminating groundwater sources.

**8. Using cover crops primarily helps to improve what aspect of farming?**

**A. Soil Erosion**

**B. Soil Structure**

**C. Labor Costs**

**D. Crop Pricing**

Using cover crops primarily helps to improve soil structure, which is critical for sustainable agricultural practices. Cover crops, such as legumes and grasses, contribute organic matter to the soil as they grow and when they decompose. This organic matter enhances the soil's physical properties, leading to better aggregation, porosity, and water retention. Improved soil structure helps create a more favorable environment for roots to grow and increase the soil's ability to hold nutrients and water, ultimately boosting crop productivity. While cover crops can also help in reducing soil erosion and contribute positively to soil fertility and health, the most direct impact is on soil structure. This enhanced structure not only reduces compaction but also fosters beneficial microbial communities and improves overall soil health, which is crucial for long-term farming success. Other aspects such as labor costs and crop pricing are secondary effects and not the primary focus of utilizing cover crops.

**9. How does the optimum temperature for crop growth and development change?**

- A. It remains constant throughout**
- B. It increases with crop age**
- C. It changes with crop growth stage**
- D. It decreases in hotter climates**

The optimum temperature for crop growth and development indeed changes with the growth stage of the crop. As plants progress from germination to maturation, their temperature requirements can vary significantly. For example, young seedlings often prefer cooler conditions, while established plants or those in the reproductive stages may thrive at warmer temperatures. This variance is influenced by physiological and biochemical changes in the plant, which affect how efficiently it can photosynthesize, absorb nutrients, and manage water stress. In contrast, options suggesting a constant temperature or a temperature increase with crop age do not take into account the different physiological needs at various stages of growth. Crops may require lower temperatures initially for germination and rooting, with an increase in temperature preference as they mature. The idea that optimum temperatures decrease in hotter climates, while it may reflect certain stressed growing conditions, does not capture the concept that crops have specific temperature thresholds that can change based on their developmental stage. Thus, recognizing that the optimum temperature adjusts throughout the crop's growth stages is crucial for effective crop management and maximizing yields.

**10. What site characteristic increases the potential for soil and water pollution by a pesticide?**

- A. Low Erosion**
- B. High Erosion**
- C. Good Drainage**
- D. Rich Organic Matter**

The potential for soil and water pollution by a pesticide is significantly influenced by erosion characteristics of a site. High erosion rates can lead to the loss of topsoil, which often contains valuable nutrients and organic matter. When pesticides are applied to land that experiences high erosion, they can be easily washed away from the target area into nearby water bodies or transported over land, especially during heavy rainfall events. This runoff not only diminishes the effectiveness of the pesticide application in controlling pests but also increases the risk of contaminating surface waters and groundwater systems. In contrast, low erosion characteristics generally promote better soil retention and provide a more stable environment for the application of pesticides, thereby reducing the risk of movement into water resources. Good drainage conditions could also help reduce the standing water that can enhance the movement of pollutants, while rich organic matter typically supports beneficial microbial activity that can degrade certain pesticides. Hence, high erosion stands out as the site characteristic that creates a greater risk for pesticide-related pollution.