West Virginia CTE

The Science of Agriculture

Plant Science

1. **Identify plants & plant diseases.** 0102.1
   1. Identify plants including herbaceous plants, annual, biennial, and perennial types. 0102.1.1
   2. Identify weed species. 0102.1.2
   3. Demonstrate knowledge of the systematic classification of plants. 0102.1.3
   4. Assess and identify symptoms of crop diseases. 0102.1.4
   5. Explain the processes and benefits of crop rotation. 0102.1.5

2. **Describe entomology.** 0102.2
   1. Identify insect pests. 0102.2.1
   2. Explain the steps of metamorphosis. 0102.2.2
   3. Define Integrated Pest Management. 0102.2.3

3. **Demonstrate understanding of soil preparation, propagation techniques, and regulating environmental conditions in plant production systems.** 0102.3
   1. Prepare soil for planting, and plant or transplant seeds, bulbs, and cuttings. 0102.3.1
   2. Plant seeds in specified areas and count the resulting plants to determine the percentage of seeds that germinated. 0102.3.2
   3. Perform duties including propagating varieties of plant materials, collecting and germinating seeds, maintaining cuttings of plants, and controlling environmental conditions, and regulating irrigation systems. 0102.3.3
   4. Prepare data summaries, reports, or analyses that include results, charts, or graphs to document research findings and results. 0102.3.4
   5. Research the requirement of becoming a USDA Certified Organic crop producer. 0102.3.5

Soil Science

4. **Identify components of soil (e.g., soil texture, soil horizon).** 0102.4
   1. Study soil characteristics to classify soils on the basis of factors such as geographic location, landscape position, or soil properties. 0102.4.1

5 **Demonstrate knowledge of soil nutrients (e.g., soil pH, calculate amounts of fertilizer, eutrophication).** 0102.5

1 Analyze soil to determine types or quantities of fertilizer required for maximum crop production. 0102.5.1

2 Conduct studies of nitrogen or alternative fertilizer application methods, quantities, or timing to ensure satisfaction of crop needs and minimization of leaching, runoff, or denitrification. 0102.5.2

3 Explore components of urban and suburban market gardening. 0102.5.3

6 **Describe land capability use (e.g., land capability class, soil management practices).** 0102.6

1 Provide information or recommendations to farmers or other landowners regarding ways in which they can best use land, promote plant growth, or avoid or correct problems such as erosion. 0102.6.1

2 Investigate responses of soils to specific management practices to determine the use capabilities of soils and the effects of alternative practices on soil productivity. 0102.6.2

3 Investigate soil problems and poor water quality to determine sources and effects. 0102.6.3

4 Assess comparative soil erosion from various planting or tillage systems, such as conservation tillage with mulch or ridge till systems, no-till systems, or conventional tillage systems with or without moldboard plows. 0102.6.4

Animal Nutrition

7 **Determine nutritional needs of livestock (e.g., essential nutrients, protein, calculate feed, Pearson Square).** 0102.7

1 Study effects of feed on quality and quantity of animal products, such as eggs and milk. 0102.7.1

2 Study nutritional requirements of animals and nutritive values of animal feed materials. 0102.7.2

3 Select appropriate feedstuffs for animals based on factors such as economics, digestive system and nutritional needs. 0102.7.3

4 Formulate animal feeds based on nutritional requirements, using feed ingredients for maximum nutrition and optimal economic production. 0102.7.4

5 Appraise the adequacy of feed rations using data from the analysis of feedstuffs, animal requirements, and performance. 0102.7.5

6 Research the components of becoming a USDA Certified Organic livestock producer. 0102.7.6

8 **Differentiate forage production (e.g., carrying capacity).** 0102.8

1 Monitor pasture or grazing land use to ensure that livestock are properly fed or that conservation methods, such as rotational grazing, are used. 0102.8.1

Small Gas Engine Maintenance and Repair

9 **Cycles of a small engine.** 0102.9

1 Discuss the cycle of a 2-cycle engine. 0102.9.1

2 Discuss the cycle of a 4-stroke engine. 0102.9.2

10 **Identify parts.** 0102.10

1 Identify the parts of small engine components 0102.10.1

2 Demonstrate knowledge of the usage of a small engine parts manual. 0102.10.2

11 **Demonstrate knowledge of small engine maintenance (e.g., service manuals, fluid levels).** 0102.11

1 Repair and maintain gasoline engines used to power equipment such as portable saws, rototillers, lawn mowers, generators, and compressors. 0102.11.1

2 Adjust points, valves, carburetors, distributors, and spark plug gaps, using feeler gauges. 0102.11.2

3 Reassemble engines after repair or maintenance work is complete and ensure that the reassembled engine is operational. 0102.11.3

4 Record repairs made, time spent, and parts used. 0102.11.4

5 Perform routine maintenance such as cleaning and oiling parts, honing cylinders, and tuning ignition systems. 0102.11.5

6 Obtain problem descriptions from customers and prepare cost estimates for repairs. 0102.11.6