Idaho CTE

Ornamental Horticulture (2024)

PROFESSIONAL ORGANIZATIONS AND LEADERSHIP 1.0

1 **Student Leadership in Career Technical Student Organizations (CTSO) and Professional Associations** 1.1

1. Explore the role of professional organizations and/or associations in the horticulture industry. 1.1.1
2. Define the value, role, and opportunities provided through career technical student organizations. 1.1.2
3. Engage in career exploration and leadership development. 1.1.3

2 **Supervised Agricultural Experience** 1.2

1. Maintain SAE record books. 1.2.1
2. Describe the proficiency award areas related to SAE program area. 1.2.2
3. Describe necessary steps to receive higher degrees in FFA. 1.2.3

CAREER OPPORTUNITIES 2.0

1 **Career Exploration in Ornamental Horticulture** 2.1

1. Identify potential careers in ornamental horticulture and plant science. 2.1.1
2. Describe employability traits required for a successful career in the ornamental horticulture industry. 2.1.2
3. Describe industry education and certification requirements to enter or advance in the industry. 2.1.3

SAFETY IN THE INDUSTRY 3.0

1 **Safe Work Practices** 3.1

1. Follow personal protection equipment (PPE) requirements, according to industry and OSHA guidelines. 3.1.1
2. Describe the importance of the information on safety data sheets (SDS) and where they can be located. 3.1.2
3. Identify common hand tools and power equipment. 3.1.3
4. Demonstrate safety practices when using hand tools and power equipment, including following manufacturer guidelines, identifying hazards, and using safety features of the tools and equipment. 3.1.4

PLANT ANATOMY 4.0

1 Plant Cells 4.1

1. Label the parts of a plant cell. 4.1.1
2. Compare a plant to an animal cell. 4.1.2
3. Describe the function of plant cell organelles. 4.1.3

2 Root Anatomy 4.2

1. Describe the functions of roots in plants. 4.2.1
2. Identify the parts of a root. 4.2.2
3. Compare the two major types of root systems. 4.2.3
4. Describe specialized structures in roots. 4.2.4

3 tem Anatomy 4.3

1. List the functions of a stem. 4.3.1
2. Identify the external structures of a stem. 4.3.2
3. Describe the internal structures of a stem cell. 4.3.3
4. Describe specialized structures in stems. 4.3.4

4 Leaf Anatomy 4.4

1. Define the main parts of a leaf. 4.4.1
2. Compare common vein patterns found in leaves. 4.4.2
3. List the functions of a leaf, including photosynthetic energy conversion. 4.4.3
4. Define the difference between leaf shape and leaf margin. 4.4.4
5. Compare major leaf arrangements (i.e., alternating, opposite, whorled, basal). 4.4.5

5 Flower Anatomy 4.5

1. Describe the parts of a flower. 4.5.1
2. Describe the function of a flower. 4.5.2
3. Compare types of flowers (e.g., complete, incomplete, perfect, imperfect). 4.5.3
4. Describe the process of plant pollination and fertilization. 4.5.4

6 Fruit Anatomy 4.6

1. Describe the parts of a fruit. 4.6.1
2. Identify types of fruits of economic importance in Idaho. 4.6.2

7 Seed Anatomy 4.7

1. Identify the major parts of a seed. 4.7.1
2. List the function of each major part of a seed. 4.7.2

PLANT PHYSIOLOGY 5.0

1 Energy Conversion In Plants 5.1

1. Describe the process of photosynthesis. 5.1.1
2. Describe the process of respiration. 5.1.2

2 Transport within a Plant System 5.2

1. Compare the active and passive transport of water and nutrients through the root systems. 5.2.1
2. Compare the structure and function of xylem and phloem cells and tissues. 5.2.2

3 Environmental Requirements for Plant Growth 5.3

1. Determine the effect of different light sources (e.g., spectrum, intensity) on plant growth (e.g., artificial, natural). 5.3.1
2. Describe the effects of water quality on plant growth (e.g., pH, hardness). 5.3.2
3. Describe the effects of temperature on plant growth. 5.3.3
4. Describe the factors that affect plant suitability for a selected site, using a hardiness zone map and heat zone map. 5.3.4
5. Define plant tropisms (e.g., photo-, thigma-, gravi-). 5.3.5

4 Plant Growth Regulators 5.4

1. Compare the functions of plant hormones. 5.4.1
2. Describe commercial uses for plant growth regulators. 5.4.2

PLANT IDENTIFICATION SKILLS 6.0

1 Plant Categorization 6.1

1. Describe the classification and naming of plants. 6.1.1
2. Identify the major groups of plants. 6.1.2
3. Describe the difference between monocot and dicot. 6.1.3
4. Categorize common plants by life cycle (e.g., annuals, perennials). 6.1.4
5. Categorize plants by growth habits (e.g., mounding, trailing). 6.1.5
6. Describe the importance of identifying plants by botanical and common names in the industry. 6.1.6

GROWING MEDIA 7.0

1 Soil Texture and Structure 7.1

1. List the components of soil. 7.1.1
2. Describe the concept of soil texture and its importance. 7.1.2
3. Classify the texture of a soil sample. 7.1.3
4. Identify various soil structures, their formation, and importance in agriculture production. 7.1.4

2 Soilless Growing Media 7.2

1. Identify the components and source of soilless growing media. 7.2.1
2. Describe the functions of growing media. 7.2.2
3. Determine desirable properties of growing media (i.e., drainage, organic matter, micro- organisms). 7.2.3
4. Evaluate the advantages and disadvantages of soilless media. 7.2.4

3 Chemical Characteristics of Growing Media 7.3

1. Determine pH range of growing media for optimal plant growth. 7.3.1
2. Interpret pH test results of a growing media sample. 7.3.2
3. Describe the importance of electrical conductivity (EC) of various growing media. 7.3.3
4. Analyze the relationship between soil media and nutrient availability. 7.3.4

4 Water-Holding Capacity (WHC) 7.4

1. Describe water-holding capacity of soils and its relationship to the water cycle. 7.4.1
2. Describe the factors that determine a soil's water-holding capacity. 7.4.2

PLANT NUTRITION 8.0

1 Fertilizer Formulation 8.1

1. Compare macronutrients and micronutrients. 8.1.1
2. Measure pH and describe how it is modified. 8.1.2
3. Identify the main components of fertilizer. 8.1.3
4. Interpret a fertilizer label. 8.1.4
5. Categorize methods of application (e.g., granular, time released, injector, foliar). 8.1.5
6. Calculate a lawn fertilizer application rate. 8.1.6

2 Plant Nutrients 8.2

1. Correlate plant symptoms to nutritional deficiency. 8.2.1
2. Correlate plant symptoms to plant toxicity 8.2.2

INTEGRATED PEST MANAGEMENT (IPM) 9.0

1 Integrated Pest Management 9.1

1. Define Integrated Pest Management (IPM) (e.g., physical, chemical, mechanical, biological). 9.1.1
2. Describe the benefits of IPM. 9.1.2

2 **Common Pests and Diseases** 9.2

1 Identify common plant pests and diseases. 9.2.1

2 Identify common weeds, insects, rodents, and fungi. 9.2.2

3 Compare abiotic and biotic diseases. 9.2.3

4 Identify abiotic plant injuries. 9.2.4

3 **Safe Handling, Use, and Storage of Pesticides** 9.3

1 Identify safety measures when applying pesticides. 9.3.1

2 Interpret pesticide labels. 9.3.2

3 Describe procedures for storing and disposing of pesticides. 9.3.3

4 Evaluate environmental and consumer concerns regarding pest management and biodiversity. 9.3.4

5 Describe requirements for obtaining pesticide applicator licenses. 9.3.5

PLANT PROPAGATION

10.0

1 **Sexual Propagation of Ornamental Plants** 10.1

1 Compare sexual and asexual propagation. 10.1.1

2 Describe the process of seed germination. 10.1.2

3 Identify the conditions needed for seed germination. 10.1.3

4 Compare the methods of seed preparation. 10.1.4

5 Demonstrate the technique for sowing seeds. 10.1.5

6 Calculate germination percentage. 10.1.6

2 **Asexual Propagation of Ornamental Plants** 10.2

1 Describe optimum conditions for asexual propagation. 10.2.1

2 Demonstrate techniques used to propagate plants by cutting. 10.2.2

3 Demonstrate techniques used to propagate plants by division. 10.2.3

4 Demonstrate techniques used to propagate plants by separation. 10.2.4

5 Demonstrate techniques used to propagate plants by layering. 10.2.5

6 Describe micropropagation and its importance in the ornamental horticulture industry. 10.2.6

7 Describe grafting and its importance in the ornamental horticulture industry. 10.2.7

ORNAMENTAL HORTICULTURE CROPS

11.0

1 **Crop Production** 11.1

1 Develop a growing schedule for a spring plant sale. 11.1.1

2 Space crops, using best management practices. 11.1.2

3 Select containers and medium suitable for a crop. 11.1.3

2 Growth Maintenance Procedures 11.2

1. Compare hard and soft pinches. 11.2.1
2. Pinch plants, using best management practices. 11.2.2
3. Demonstrate pruning techniques. 11.2.3
4. Demonstrate watering techniques. 11.2.4

3 Transplanting 11.3

1. Identify the stage of plant growth for transplanting. 11.3.1
2. Demonstrate transplanting procedures to industry standards. 11.3.2

4 Production Standards 11.4

1. Describe how to harden plants. 11.4.1
2. Prepare plants for sale, using best management practices. 11.4.2
3. Describe industry crop standards for greenhouse ornamental crop production (e.g., American National Standards Institute [ANSI], American Standard for Nursery Stock [ASNS], National Association for Landscape Professionals [NALP]). 11.4.3

PLANT TECHNOLOGIES

12.0

1 Selective Plant Breeding 12.1

1. Describe the selective plant breeding process. 12.1.1
2. Describe how to estimate the heritability of certain traits. 12.1.2
3. Predict the genotypes and phenotypes from monohybrid and dihybrid crosses, using a Punnett Square. 12.1.3

2 Genetic Engineering 12.2

1. Describe the advantages and disadvantages for genetic manipulation of plants. 12.2.1
2. Identify transgenic plants on the market. 12.2.2
3. Describe how biotechnology can create new plant varieties. 12.2.3

3 Hydroponic Techniques 12.3

1. Define hydroponics and its importance to society. 12.3.1
2. Describe procedures used in hydroponic plant production. 12.3.2

ORNAMENTAL DESIGN STANDARDS 13.0

1 Principles and Elements of Design 13.1

1. Compare visual balance, using symmetry, asymmetry, and massing. 13.1.1
2. Describe how the principles of dominance and focal point are used in design. 13.1.2
3. Describe the function of proportion and scale in a design. 13.1.3
4. Describe the function of rhythm in a design. 13.1.4
5. Describe the relationship of color to emotions and symbolism. 13.1.5
6. Create a desired design atmosphere, using color, texture, and form. 13.1.6

2 Implementation of Principles and Elements of Design 13.2

1. Create a design. 13.2.1
2. Justify design choices (i.e., design elements) of a completed design. 13.2.2

BUSINESS CONCEPTS 14.0

1 Marketing 14.1

1. Describe the need for developing a marketing plan. 14.1.1
2. Develop a marketing plan for ornamental crop sales. 14.1.2
3. Design a business display for an identified target audience (e.g., social media, signage, production displays). 14.1.3

2 Principles of Sales 14.2

1. Analyze the relationship between marketing and selling. 14.2.1
2. Demonstrate the use of a point of sale (POS) system or other electronic invoice system. 14.2.2
3. Describe the importance of supply inventory. 14.2.3
4. Describe characteristics of an effective salesperson and terminology related to sales. 14.2.4
5. Participate in a speech or presentation activity. 14.2.5
6. Analyze the customer buying process. 14.2.6
7. Identify the steps involved in the selling process. 14.2.7
8. Identify the benefits of various types of sales, including through social media and e-commerce. 14.2.8
9. Assess the components of an effective business website. 14.2.9

3 Business Management 14.3

1. Describe factors of business management (e.g., cost of goods sold, product markup, estimates and bids, sales price, profit). 14.3.1
2. Demonstrate work ethic and professionalism (i.e., Idaho Workplace Readiness Skills) necessary for success in the industry. 14.3.2