Arkansas CTE

Plant Science II: Grades 9, 10, 11, 12

Adopted 2014

Plant Growth

1.1 Determine the influence of environmental factors on plant growth

1. Describe plant responses to light. (long day, short day, day neutral, phototropism, photoperiodism) 1.1.1
2. Differentiate the effects air, temperature and water have on plant metabolism and growth. (hardiness zones, humidity) 1.1.2

1.2 Evaluate growing media for use in plant systems

1. Evaluate growing medias as to the major components of soil. (mineral matter, organic matter, air, water) 1.2.1
2. Analyze types of soilless growing media. (peat, vermiculite, perlite) 1.2.2
3. Differentiate soil texture. (sand, silt, clay) 1.2.3
4. Assess the categories of soil water. (capillary, gravitational, hydroscopic) 1.2.4

1.3 Develop and implement a fertilization plan for specific plants or crops

1. Analyze the three major nutrients for plant growth and development and their major functions. (Nitrogen, Phosphorus, Potassium) 1.3.1
2. Evaluate pH as it relates to plant growth. (alkalinity, acidic) 1.3.2
3. Assess fertilizer sources of essential plant nutrients (organic, inorganic), 1.3.3
4. Analyze different types of fertilizers. (granular, time released, water soluble) 1.3.4
5. Evaluate fertilizer analysis. 1.3.5

Plant Diseases and Insects

2.1 Develop and implement a plan for integrated pest management

1. Design pest control strategies utilizing integrated pest management (IPM). (biological pest control, mechanical pest control, cultural pest control, chemical pest control) 2.1.1
2. Differentiate methods of chemical pest controls. (insecticide, herbicide, miticide, rodenticide, fungicide, molluscicide) 2.1.2

2.2 Develop and implement a plan for pest management

1. Assess types of plant pests (insects, wildlife, weeds) 2.2.1
2. Assess types of diseases. (fungus) 2.2.2
3. Assess types of disorders. (nutrient deficiency) 2.2.3

Plant Genetics

3.1 Analyze Genetic Inheritance

1. Explain genetic inheritance in plants in terms of genes, chromosomes and DNA 3.1.1
2. Assess and analyze dominant and recessive traits in terms of alleles, genotype, phenotype, homozygous, heterozygous and hybrid vigor 3.1.2

3.2 Apply Genetic Inheritance to modern plant production

1. Predict possible offspring of matings by using the Punnett Square 3.2.1
2. Explain how genetic principles are used to improve agricultural production. 3.2.2
3. Analyze the benefits and concerns associated with genetically modified organisms (GMO). 3.2.3

Plant Physiology

4.1 Analyze plant fertilization processes

1. Diagram the process of plant fertilization 4.1.1
2. Synthesize the conditions needed for seed germination (temperature, moisture, light, oxygen) 4.1.2

4.2 Analyze plant propagation

1. Investigate asexual propagation methods (cuttings, division, separation, grafting, micropropagation and layering) 4.2.1
2. Explain cross-pollination and self-pollination of flowering plants 4.2.2
3. Differentiate pollination techniques in annuals and perennials 4.2.3