Kansas CTE

Plant & Soil Science (2018)

History and Careers in Plant Science

1. Investigate the diversity of careers in plant science 1
2. Attend job or career fields 2
3. Contact plant science professional organizations 3
4. Job shadow a professional in the plant industry 4
5. Create a timeline of the history of plant science, relating the past, present and future 5

Basic soil properties and fertility

1. Define soil texture and structure 1
2. Use the textural triangle to identify classification
3. Describe water holding capacity, available water, and wilting points, permeability, leaching are effected by soil texture and nutrient availability
4. Perform and Interpret soil test data and give objective recommendations 4
5. Describe how mass flow, diffusion, and root interception affect nutrient uptake 5
6. Illustrate the N-cycle and how climate, soil, and plants effect it 6
7. Describe and distinguish between the different soil management practices in Ag 7
8. Describe how pH affects soil health and nutrient availability 8
9. Distinguish between point and nonpoint sources in the environment 9
10. Illustrate the water cycle and how climate, soil, and plants effect it 10
11. List and differentiate between micro and macro soil nutrients 11
12. Outline the impact of soils on crop yields 12
13. Identify various types of parent material types and soil forming factors 13
14. Describe methods of building soil fertility 14
15. Explain considerations for determining N, P, and K for soil fertility and plant growth 15

	16 Formulate the proper mix of dry fertilizer 16
Plant Structures/Systems	1 Explain the process of translocation 1
	2 Identify and describe the function of plant cell 2
	3 Identify the parts of monocot and dicot seeds and list their functions 3
	4 Distinguish between GMO and PLS plants and seeds 4
	5 Describe methods of plant classification/nomenclature and the action of variation in natural selection 5
	6 Define how evapo-transpirations relates to plant growth 6
	7 Define photoperiodism 7
	8 Explain the processes of photosynthesis, respiration, and transpiration as a cyclical growth representation 8
	11 Illustrate the sink/source of the complete carbon cycle 11
	12 Illustrate the sink/source of the complete oxygen cycle 12
	13 Discuss the means and effects of pollination 13
	14 Relate the growing degree day concept to crop development 14
	15 Understand how temperature is important in plant development and growth (cardinal temperatures) 15
Weed, Disease, and Pest Control	1 Identify weed, disease, and pest damage 1
	2 Show disease material handling techniques 2
	3 Identify safe procedures when handling pesticides 3
	4 Calculate pesticide application rates 4
	5 Identify the components of a pesticide label 5
	6 Demonstrate how to mix pesticides 6
	7 Describe the general principles of IPM 7
	8 Distinguish between resistance and tolerance 8
	9 Recognize the differences in pesticide formulation from climatic conditions, using additives for drift or volatilization 9

	10	Identify weeds from broadleaf and grass seedlings 10
	11	Relate how weed life cycles differ from crop life cycles 11
	12	Recognize the role of natural selection in disease, weed, and pest control in a cropping practice 12
	13	Determine the best control measure for a given pest 13
	14	Relate how insect behavior is linked with a cropping practice 14
	15	Generate a list of beneficial insects and plants that counteract harmful weeds, diseases, and pests 15
	16	Describe strategies needed for disease management 16
	17	Explain the use of pesticides as a pest management strategy 17
	18	Explain how stewardship, pesticide safety, and government regulation impact common cropping decisions 18
	19	Understand how factors of pressure, speed, nozzle type, and spacing affect pesticide treatment success 19
	20	Describe the effects of herbicide: adjuvants, contact, systemic 20
Fertilizer Applications	1	List characteristics of solid, gas, and liquid fertilizers 1
	2	Understand the effects of starter fertilizer on crop growth and yield 2
	3	Distinguish how fertilizer placement and time of application affect nutrient availability 3
Crop Evaluation	1	Properly classify common crops and weeds 1
	2	Describe standards used in USDA grain grading 2
	3	Identify principles of irrigated water vs. dry land in crop growth, seed formation, and quality 3
Biotechnology Issues	1	Access and review material from biotechnology firms; i.e. Monsanto, Pioneer, etc. 1
	2	Discuss the most recent advances; i.e. Bt Corn, Round-Up Ready crops 2
	3	Discuss moral issues in biotechnology and gene tampering 3
	4	Discuss the role of biotechnology to improve plant genetics and production 4

Crop Storage

1. **Describe how temperature, aeration, pests, crop condition at harvest, length of storage, and additives influence crop quality** 1
2. **Discuss the difference between retained ownership and storage under warehouse receipt** 2
3. **Calculate volume of bins and storage areas** 3
4. **Calculate relative humidity, dew point, wet/dry bulb temperature, and saturation point** 4
5. **Calculate moisture content, drying efficiency, and gas consumption for drying high moisture corn** 5