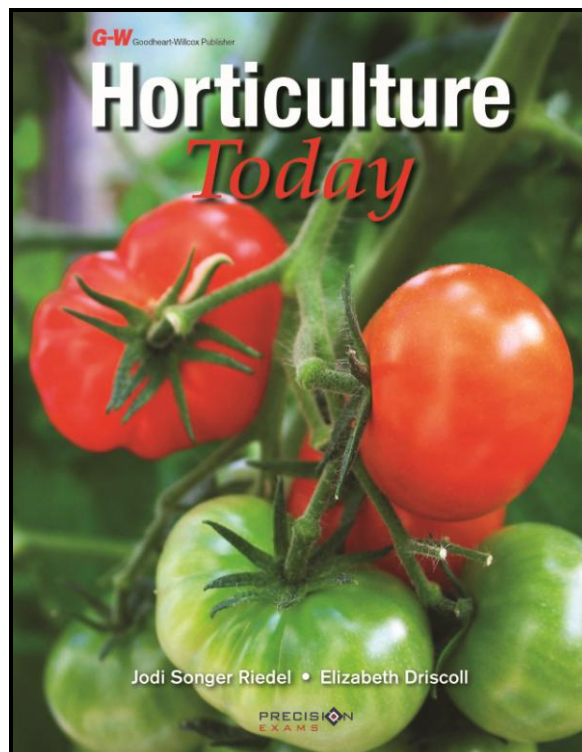


Correlation of
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to
Precision Exams Plant and Soil Science

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The correlation chart below lists the Standards, Objectives, and Indicators for the Plant and Soil Science exam in the left column. Corresponding content from *Horticulture Today* that can be used by a student to help achieve the standard, objective, or indicator is listed in the right column.

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Standards / Objectives / Indicators	Textbook Pages
Standard 1: Develop Personal, Leadership, and Career Skills through FFA Participation	
Objective 1. Assess the role of FFA participation in developing personal and leadership skills.	Leadership Development in FFA, 14
Indicator 1: Identify important personal skills and the strategies to use in developing the skills.	Leadership Characteristics, 4–5; Develop a Leadership Path, 5–9; Leadership Development, 8
Indicator 2: Identify important leadership skills and the role of FFA participation in developing the skills.	Leadership Characteristics, 4–5; Leadership Development in FFA, 14
Objective 2. Assess the role of FFA participation in developing career skills.	Leadership Development in FFA, 14; FFA Program of Activities, Student Development, 18
Indicator 1: List and describe proficiency awards appropriate for horticulture.	Agricultural Proficiency Awards, 50–51

Standards / Objectives / Indicators	Textbook Pages
Indicator 2: List and describe career development events appropriate for horticulture.	Career Development Events, 22–23; Creed Speaking, 23; Agricultural Communications, 44; Marketing Plan CDE, 146; Equipment Identification, 169; Land Judging, 282; Equipment and Supplies Identification, 552; Plant Identification, 563; Floriculture, 678; Pests and Disorders Identification, 790; Disease Identification, 847
Indicator 3: Relate the importance of supervised agricultural experience to FFA achievement.	Supervised Agricultural Experience, 23–24; SAE Purpose, 33–34
Indicator 4: Utilize FFA and supervised agricultural experience participation to gain advanced degrees of FFA membership.	Star Awards, 51–52
Standard 2: Explain the Maintenance and Expansion of Supervised Agricultural Experience (SAE) Programs	
Objective 1. Maintain and use SAE records.	Keep Records, 49–50
Indicator 1: Explain how SAE records are maintained from year to year.	Keep Records, 49–50
Indicator 2: Explain how to summarize and analyze SAE records.	Keep Records, 49–50
Objective 2. Devise long-range plans for expanding SAE programs.	Goals, 48
Indicator 1: Evaluate the overall quality of a current SAE and determine how to make it more productive or profitable.	Improvement SAE, 41
Indicator 2: Explain factors that should be considered in expanding an SAE program.	Student Resources, 46
Indicator 3: Explain how placement and ownership SAE programs may be expanded.	Placement SAE, 36; Entrepreneurship SAE, 34–35
Standard 3: Explain the History, Importance, and Scope of Plant Science	
Objective 1. Discuss the history of agriculture.	History of the National FFA Organization, 11; SAE History, 32; Turfgrass Industry, 102; Cesar Chavez, 157; Plant Taxonomy, 180; George Washington Carver, 201; Soil Scientists, 302; J.C. Raulston, 373; The Tree Circus, 408; Micropropagation, 430; Percy Julian, 482; Hydroponics, 508; Wake Island, 510; Aquaponics, 515; Frederick Law Olmsted, 633; Palace of Versailles, 639; Monticello and Poplar Forest, 725; Irish Potato Famine, 848
Indicator 1: Explain how the science of agriculture helped develop civilization, including agronomic, horticultural, and forestry plants.	What is Plant Science? 92–93; Edible and Ornamental Horticulture, 93–104

Standards / Objectives / Indicators	Textbook Pages
Indicator 2: Identify the major innovators and milestones in the advancement of agriculture.	Turfgrass Industry, 102; Cesar Chavez, 157; Plant Taxonomy, 180; George Washington Carver, 201; Soil Scientists, 302; J.C. Raulston, 373; The Tree Circus, 408; Micropropagation, 430; Percy Julian, 482; Hydroponics, 508; Wake Island, 510; Aquaponics, 515; Frederick Law Olmsted, 633; Palace of Versailles, 639; Monticello and Poplar Forest, 725; Irish Potato Famine, 848
Objective 2. Discuss the importance of plant science.	What is Plant Science? 92–93
Indicator 1: Identify the various roles of plants in everyday life.	Agronomy, 93; Edible and Ornamental Horticulture, 93–104; Biological and Environmental Impacts, 110; Vegetables for Health, 570; Fruits for Health, 600; Interior Landscaping, 692–695; Turfgrass Benefits, 748
Indicator 2: Identify agriculturally important plants and explain their uses.	Vegetable Production, 568–597; Fruit and Nut Production, 598–629
Objective 3. Identify career opportunities in plant science.	Agricultural Inspector, 53; Horticultural Extension Agent, 82; Viticulturists, 97; Herbarium Director, 190; Ecologist, 191; Plant Taxonomist, 191; Botanist, 218; Science Teacher, 218; Plant Physiologist, 241; Plant Breeder, 242; Soil Scientists, 302; Nursery Propagator, 358; Fruit Nursery Propagator, 398; Orchard Manager, 398; Vineyard Manager, 423; Micropropagation Lab Technician, 441; Cryopreservation Scientist, 441; Aquaponic System Manager, 530; Grower, 624; Food Safety Manager, 624; Aquatic Plant Grower, 658; Horticultural Technician, 711; Sports Turf Manager, 773; Turfgrass Breeder, 773; Research Scientist, 797; Agricultural Research Entomologist, 823; Education Entomologist, 823; Plant Pathologist, 852; Farm Advisor, 853; Nursery Owner, 853; Crop Consultant, 871; Weed Scientist, 871; Pesticide Chemist, 894
Indicator 1: Identify and describe the major areas of plant science.	What is Plant Science? 92–93
Indicator 2: Identify career opportunities in plant science and determine the education and training they entail.	Agricultural Inspector, 53; Horticultural Extension Agent, 82; Viticulturists, 97; Herbarium Director/Curator, 190; Ecologist, 191; Plant Taxonomist, 191; Botanist, 218; Science Teacher, 218; Plant Physiologist, 241; Plant Breeder, 242; Soil Scientists, 302; Nursery Propagator, 358; Fruit Nursery Propagator, 398; Orchard Manager, 398; Vineyard Manager, 423; Micropropagation Lab Technician, 441; Cryopreservation Scientist, 441; Aquaponic System Manager, 530; Living Wall Designer, 530; Grower, 624; Food Safety Manager, 624; Aquatic Plant Grower, 658; Horticultural Technician, 711; Sports Turf Manager, 773; Turfgrass Breeder, 773; Research Scientist, 797; Agricultural Research Entomologist, 823; Education Entomologist, 823; Plant Pathologist, 852; Farm Advisor, 853; Nursery Owner, 853; Crop Consultant, 871; Weed Scientist, 871; Pesticide Chemist, 894

Standards / Objectives / Indicators	Textbook Pages
Standard 4: Explain Soil Science Concepts	
Objective 1. Explain the meaning and importance of soil.	Chapter 11, Soils and Media, 278–309
Indicator 1: Explain the importance of soil as a life-supporting layer.	Chapter 11, Intro, 280
Indicator 2: Describe the agricultural and the nonagricultural uses of soil.	Soil and Soilless Media, 293–296; Essential Elements, 312; Field Nursery Seedbeds, 349; Seed Propagation (Media) 351; Drainage and Soil Quality (Greenhouse Operation and Maintenance), 451; Greenhouse Production, Media, 489; Raised Bed Media, 528; Vegetable Production, Soil, 576; Small Fruits, Soil, 603
Objective 2. Describe basic physical, biological, and chemical properties of soil and soilless media.	Chapter 11, Soils and Media, 278–309
Indicator 1: Explain soil components.	Soil Formation, 280–282
Indicator 2: Describe the physical characteristics of soil and soilless media.	Physical Properties of Soil, 282; Soil and Soilless Media, 293–296
Indicator 3: Describe the biological activity within soil and soilless media.	Biological Properties of Soil, 288–290; Soil and Soilless Media, 293–296
Indicator 4: Describe the chemical properties of soil and soilless media.	Chemical Properties of Soil, 290–293; Soil and Soilless Media, 293–296
Indicator 5: Explain the characteristics of water movement in soil and soilless media.	Soil Water, 287
Objective 3. Explain soil fertility.	Soil Testing, 292–293; Soilless Media, 295–296
Indicator 1: Describe the meaning and importance of soil fertility.	Physical Properties of Soil, 282; Small Fruits, Soil and Fertility, 604; Vine Fruits, Soil, 617
Indicator 2: Explain the role of organic matter, soil depth, surface slope, soil organisms, and nutrient balance in soil productivity.	Biological Properties of Soil, 288–290; Soil pH, 291–292; Mulch, 296–300; Nutrient Sources, 324–328; Small Fruits, Soil, 603
Standard 5: Describe Plant Anatomy and Physiology Concepts	
Objective 1. Explain plant classification.	History of Plant Taxonomy, 180–181; A System of Botanical Classification, 181–188
Indicator 1: Explain systems used to classify plants.	A System of Botanical Classification, 181–188; Plant Keys, 188
Indicator 2: Compare and contrast the hierarchical classification of agricultural plants.	A System of Botanical Classification, 181–188
Indicator 3: Classify plants according to life cycles, plant use, and status as monocotyledons or dicotyledons.	A System of Botanical Classification, 181–188
Objective 2. Explain the structures of plant cells and important cell processes.	Chapter 8, Plant Biology, 196–223
Indicator 1: Describe the structures of a typical plant cell and their functions.	Plant Cells, 199–203

Standards / Objectives / Indicators	Textbook Pages
Indicator 2: Compare and contrast mitosis and meiosis.	Cellular Division, 236–239
Objective 3. Describe the anatomical features of a plant and their functions.	Plant Tissues, 203–206; Plant Parts and Their Functions, 206–218
Indicator 1: Describe the structures of a seed, the types of seeds, and the function of seeds.	Seeds, 217–218
Indicator 2: Describe the components of a root, the types of roots, and the functions of roots.	Roots, 206–209
Indicator 3: Describe the structures of a stem, the types of stems, and the functions of stems.	Stems, 207–209
Indicator 4: Describe the structures of a leaf, the types of leaves, and the functions of leaves.	Leaves, 210–212
Indicator 5: Describe the major parts of a flower, their functions, and the types of flowers and flower forms.	Flowers, 212–213
Indicator 6: Describe the structures of fruit, the types of fruit, and the purpose of fruit.	Fruits, 214–216
Objective 4. Determine the influence of environmental factors on plant growth.	Chapter 10, Environmental Conditions for Growth, 248–277
Indicator 1: Describe the functions of water in plant growth.	Water, 268–271; Xylem, 205; Water Uptake and Nutrient Access, 232; Water, 234
Indicator 2: Explain plant responses to a shortage or excess of water.	Vacuoles (turgor), 202; Air Roots (overwatering), 207; ATP Production (waterlogged soils), 231; Water Uptake and Nutrient Access, 232; Water, 234; Water (Greenhouse Production), 486–488
Indicator 3: Describe efficient use of water in plant production.	Water, 268–272; Irrigation, 269–271; The Watering Decision, 488; Water Management (Nursery Production), 553–556; Efficient Irrigation (Landscape Design), 649–650; Water (Interior Landscaping), 701–703
Indicator 4: Explain the qualities of light that affect plant growth, including color, intensity, and duration.	Light Quality, 250–252; Light Quantity, 252; Photoperiod, 253–255; Optimizing Light Quantity, 255–258
Indicator 5: Explain plant responses to light.	Chloroplasts and Other Plastids, 200; Photosynthesis, 226–229; Photoperiod, 253–255; Seed Propagation, Light, 344
Indicator 6: Describe the effects of temperature on plant growth.	Temperature, 258–264; Managing Temperatures, 264–268
Indicator 7: Describe plant responses to temperature extremes.	Leaf Adaptation, 212; Respiration, 231; Transpiration, Temperature, 233; Temperature, 258–264; Managing Temperatures, 264–268
Indicator 8: Describe the effect of diseases and insects on plant growth.	Chapter 30, Insects, 802–829; Chapter 31, Disease Management, 830–857

Standards / Objectives / Indicators	Textbook Pages
Objective 5. Explain plant physiology concepts and energy conversion in plants.	Chapter 8, Plant Biology, 196–223
Indicator 1: Explain the basic process of photosynthesis and its importance to life on Earth.	Chloroplasts and Other Plastids, 200–201; Photosynthesis, 226–229
Indicator 2: Explain requirements necessary for photosynthesis to occur and identify the products and by-products of photosynthesis.	Photosynthesis, 226–229; Light-Dependent Reaction, 227–228; Light-Independent Reactions, 228–229; Respiration, 230–231; ATP Production, 230–231; Transpiration, 231–234; Movement of Solutes, 234–235
Indicator 3: Explain cellular respiration and its importance to plant life.	Respiration, 230–231; ATP Production, 230–231
Indicator 4: Explain factors that affect cellular respiration and identify the products and by-products of cellular respiration.	Respiration, 230–231; ATP Production, 230–231
Objective 6. Explain plant reproduction.	Reproduction, 235–239
Indicator 1: Compare and contrast sexual and asexual reproduction.	Cellular Division, 236–239; Plant Breeding Principles, 239–241; Seed Morphology and Development, 340–341; Layering in Propagation, 386–387; Benefits of Grafting, 406–407; Tissue Culture: Micropropagation (introduction), 430
Indicator 2: Explain pollination, cross-pollination, and self-pollination of flowering plants.	Beekeeping, 38; Fertilization, 238–239; Plant Breeding Principles, 239–241; Landraces, 353; Pollination, 608; Commercial Pollination, 819
Indicator 3: Diagram the process of plant fertilization.	Fertilization, 238–239
Indicator 4: Describe the process of seed germination.	Photoblastic Seed Germination, 251; Germination Temperature, 259; Chapter 13, Seed Propagation, 338–363
Indicator 5: Explain the conditions required for seed germination.	Seed Germination (conditions), 341; Environmental Conditions for Germination, 342–344
Indicator 6: Explain the importance of seed viability and vigor.	Seed Germination, 341
Indicator 7: Describe optimal conditions for asexual propagation.	Chapter 14, Stem and Leaf Propagation, 364–383; Rooting Medium, 376–377; Plant Growth Regulators, 377–378; Chapter 15, Layering and Division, 384–403; Chapter 16, Grafting and Budding, 404–427; Chapter 17, Tissue Culture: Micropropagation, 428–477
Indicator 8: Demonstrate techniques used to propagate plants by cuttings, division, separation, and layering.	Plant Material Used for Stem and Leaf Cuttings, 368–376; Layering and Division, 384–398; Grafting and Budding, 404–427
Indicator 9: Describe grafting techniques.	Types of Grafts, 410–419; Budding, 420–423

Standards / Objectives / Indicators	Textbook Pages
Objective 7. Explain the management of plant growth and development.	Lighting and Forced Flowering, 254; Plant Spacing and Orientation, 255; Greenhouse Design, 256; Greenhouse Covers, 256–257; Supplemental Lighting, 257; Plant Selection, 257–258; Managing Temperatures, 264–268
Indicator 1: Describe the role of the apical meristem in plant growth.	Meristem, 203
Indicator 2: Identify plant hormones and explain their functions.	Chemical Dormancy (Seed Propagation), 345; Hardwood Cuttings, 372; Leaf Cuttings, 375; Plant Growth Regulators, 377–378; Layering in Propagation, 386; Growth Media (Micropropagation), 434; Plant Growth Regulators (Greenhouse Production), 490
Indicator 3: Explain plant tropisms.	Phototropism, 254–255
Indicator 4: Differentiate between synthetic growth regulators and plant hormones.	Chemical Dormancy (Seed Propagation), 345; Hardwood Cuttings, 372; Leaf Cuttings, 375; Plant Growth Regulators, 377–378; Layering in Propagation, 386; Growth Media (Micropropagation), 434; Plant Growth Regulators (Greenhouse Production), 490
Indicator 5: Describe the benefits of using plant growth regulators.	Plant Growth Regulators, 377–378; Medium Composition, 437; Plant Growth Regulators (Greenhouse Production), 490
Standard 6: Explain the Principles of Horticulture	
Objective 1. Explain plant management for food production.	Chapter 22, Vegetable Production, 568–597
Indicator 1: Plan and prepare a vegetable/herb garden.	Growing Site, 573–574; Water, 574–576; Soil, 576; Nutrition Management, 576–577; Temperature, 577–584; Spacing, 584; Crop Rotation, 584; Integrated Pest Management, 586; Good Agricultural Practices, 586–587; Plant Material, 587–589
Indicator 2: Describe the important techniques in producing tree fruits and small fruits.	Small Fruits, 602–609; Tree Fruits and Nuts, 609–616; Vine Fruits, 616–624
Indicator 3: Describe the elements of edible landscaping and limited space food production, including rooftop, container, and raised-bed gardening.	Edible and Ornamental Horticulture, 93–104; Rooftop Gardening, 519–524; Vertical Gardening, 524–527; Raised Bed Gardening, 528–530
Indicator 4: Explain the techniques involved in producing small grain and oil crops.	Chapter 23, Fruit and Nut Production, 598–624
Indicator 5: Discuss the importance of hay and forage production to the overall food system.	Warm Season Grasses, 755–756; Cool Season Grasses, 756
Objective 2. Explain plant management for ornamental horticulture production.	Chapter 21, Nursery Production, 536–567
Indicator 1: Describe lawn establishment and care.	Chapter 28, Turfgrass Management, 744–777
Indicator 2: Plan and prepare a flower garden.	Chapter 24, Landscape Design, 630–663

Standards / Objectives / Indicators	Textbook Pages
Indicator 3: Develop a home landscape plan.	Chapter 24, Landscape Design, 630–663
Indicator 4: Describe the important techniques of landscape maintenance.	Plant Material, 727–728; Timing of Planting, 728; Preparing the Hole and Planting, 729; Wrapping and Staking, 729–730; Watering, 730–731; Fertilizing, 731–732; Pruning, 732–735; Mulching, 735–736; Irrigation (Turfgrass Management), 760–761; Mowing, 761; IPM for Lawns, 762; Turf Maintenance, 763–768
Indicator 5: Describe the elements of growing plants indoors.	Chapter 26, Interior Plantscaping, 690–715; Environmental Requirements, 700–706; Plant Management, 706–707; Insect Pests, 707–708; Diseases, 708–710