LAKEWOOD CITY SCHOOLS

STANDARDS-BASED SCIENCE COURSE OF STUDY

COURSE: HORTICULTURE

Full Year, 1 credit, 5 periods per week, grades 11-12.

… is an elective, biological science course, designed to provide a science elective for students with an interest in plant physiology, propagation, soil, landscaping, lawn maintenance, gardening, and greenhouse management. Extensive use of the high school greenhouse is involved.

Horticulture Pacing Description

Unit One: Introduction and Career Exploration ……2 weeks

Unit Two: Plant taxonomy, parts and function …… 3 weeks

Unit Three: Growth Requirements …… 4 weeks

Unit Four: Propagation Techniques……4 weeks

Unit Five: Crafts and Floral Designs …… 2 weeks

Unit Six: Container Planting / Houseplants ……5weeks

Unit Seven: Growing of Vegetables / small fruits …….5 weeks

Unit Eight: Plants in the Landscape ……5 weeks

Unit Nine: Establishing and maintaining a lawn ……3 weeks

Unit Ten: Pest Management …… 2 weeks

Unit Eleven: Greenhouse Operations …….1 week

The above timeline is meant as an approximation of time spent in each unit. Due to the nature of this course and the fact that plants need time to grow, it is not always possible to do each unit in a continuum of time. For example, the week that I have mentioned for greenhouse operation is only for the initial exposure to the facility and set up of task groups. The facility is then used throughout the course and the time is built into the other units. Also, when weather is fit, we may jump into an outdoor activity as part of another unit.

Lakewood City Schools Science Course of Study – Eleventh and Twelfth Grade

SUBJECT: Horticulture

UNIT ONE: Introduction and Career exploration

Scientific Ways of Knowing Standards: SW

11-12 Benchmarks	Grade Level Indicators	Instructional Objectives
	By the end of Twelfth Grade, the student will: Research the role of science and technology in careers that students plan to pursue. (SW-11-12)	**Local Objectives** Students will be able to: a. List and explain expectations and requirements of the course. b. Bring appropriate materials to class. c. After doing research, present information on various fields of employment within Horticulture. d. Summarize characteristics of good employees and evaluate their own career choices. e. Evaluate a budget and realize the importance of quality employment as a way to add to our society and their own lives. ***Teaching Resources*** a. Text b. LRC c. Individualized teacher introductory sheet with classroom expectations.

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SUBJECT: Horticulture

UNIT 2 Plant taxonomy / Parts and Function

Life Science Indicators: LS

11-12 Benchmarks	Grade Level Indicators	Instructional Objectives
A) Explain how processes at the cellular level affect the functions and characteristics of an organism. (LS-11-A) C) Explain how the molecular basis of life and the principles of genetics determine inheritance. (LS-11-C)	**By the end of Twelfth Grade, the student will:** Explain why specialized cells/structures are useful to plants and animals (e.g., stoma, phloem, xylem, blood, nerve, muscle, egg and sperm). (LS-12-2) Relate diversity and adaptation to structures and functions of living organisms at various levels of organization. (LS-12-7)	**Local Objectives** Students will be able to: • Explain why scientific naming of plants is used. • Explain difference between genus , species and varieties • Recall many plants by there common and botanical name • Describe the impact that plants have on the life cycle of earth • List, describe and give functions of various plant parts • Explain the process of photosynthesis • Analyze differences between monocots and dicots after growing seeds of each • Describe the process of pollination • Identify different leaf forms • Identify and explain the function of the parts of the flower ***Teaching Resources***

		• Gardening Catalogs that list Genus and species • Textbook Chapters 2 and 3 • Samples of collected leaves • Transparencies of plant parts • Microscopes for cell observations • Geranium plants • Cross sections of tree trunks • Samples of plants with tap roots and fibrous roots • Dissection of a flower activity- along with snapdragon flowers • Corn seed and bean seed • Elodea leaf for chloroplast observation

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Lakewood City Schools Science Course of Study –Eleventh and Twelfth Grade

SUBJECT: Horticulture

UNIT: 3 Growth Requirements

Earth Science Indicators: ES
Life Science Indicators: LS
Scientific Inquiry: SI

11-12 Benchmarks	Grade Level Indicators	Instructional Objectives
Describe how Earth is made up of a series of interconnected systems and how a change in one system affects other systems. (ES-11-B) Explain that humans are an integral part of the Earth's system and the choices humans make today impact natural systems in the future. (ES-11-C) Explain the interconnectedness of the components of a natural system. (LS-11-E) **Relate how biotic and abiotic global changes have occurred in the past and will continue to do so in the future. (LS-12-D)** **Explain how humans are**	**By the end of Twelfth Grade, the student will:** Analyze how the regular and predictable motions of Earth, Sun and Moon explain phenomena on Earth (e.g., seasons, tides, eclipses and phases of the Moon). (ES-11-2) Explain heat and energy transfers in and out of the atmosphere and its involvement in weather and climate (radiation, conduction, convection and advection). (ES-11-3) Explain that the Sun is essentially the primary source of energy for life. Plants capture energy by absorbing light and using it to form strong (covalent) chemical bonds between the atoms of carbon-containing (organic) molecules. (LS-12-3) Explain that carbon-containing molecules can be used to assemble larger molecules with biological activity (including proteins, DNA, sugars and fats). In addition, the energy stored in bonds between the	**Local Objectives** *(type as bullets)* Students will be able to • Describe the effect of day length on the growth of plants and why length of day changes • List factors that impact the growth of plants in the greenhouse as well as outdoors • Summarize the differences between clayey, sandy and loamy soils and be able to identify samples of each • Interpret a soil texture analysis chart • Explain what is meant by soil pH • List four above ground requirements for good growth • List the three major plant food elements and give functions for each • Explain several ways to improve soil drainage and or retention • Demonstrate how to take a soil core sample and analyze it for topsoil and subsoil • Construct a soil profile • Acquire a soil sample for testing and complete a soil analysis for Nitrogen, Phosphorus, Potassium and pH

connected to and impact natural systems. (LS-12-B	atoms (chemical energy) can be used as sources of energy for life processes. (LS-12-4) Explain why and how living systems require a continuous input of energy to maintain their chemical and physical organization. Explain that with death and the cessation of energy input, living systems rapidly disintegrate toward more disorganized states. (LS-12-9) Research and apply appropriate safety precautions when designing and/or conducting scientific investigations (e.g., OSHA, MSDS, eyewash, goggles, ventilation). (SI-12-3)	• Understand differences between Gravitational, capillary, and ground water and be able to relate these to plant growth • Define porosity, permeability and retention and relate these to different soil types • List reasons that indoor growers use soilless mixes and positives / negatives of these mixtures • List components of soilless mixes • Evaluate a fertilizer container for ingredients and explain uses for that fertilizer and proper application rates • List and describe uses of growth hormones, stimulants and retardants • Explain how dwarfing rootstock controls the growth of fruit trees ***Teaching Resources*** (type below last local obejective*)* • Soil particle activity and quart jar • Groundwater lab with sediments of varying particle size • Fertilizer samples • Soil auger • Soil test kits from LaMotte • Lab activity on growth rate of plants compared

		to amounts of light • Various samples of soilless mixes and their components • Various samples of soil • Textbook chapter 4 and 5 • Video Science of soil

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Lakewood City Schools Science Course of Study – Eleventh and Twelfth Grade

SUBJECT Horticulture

UNIT Four: Propagation Techniques

Life Science Standards: LS
Scientific Inquiry Standards: SI
Science and Technology Standards: ST
Scientific Ways of Knowing Standards: SW

11-12 Benchmarks	Grade Level Indicators	Instructional Objectives
Explain how processes at the cellular level affect the functions and characteristics of an organism. (LS-11-A) Explain how the molecular basis of life and the principles of genetics determine inheritance. (LS-11-C) Make appropriate choices when designing and participating in scientific investigations by using cognitive and manipulative skills when collecting data and formulating conclusions from the data. (SI-11-A) Explain how societal issues and	**By the end of Twelfth Grade, the student will:** Describe how the maintenance of a relatively stable internal environment is required for the continuation of life, and explain how stability is challenged by changing physical, chemical and environmental conditions as well as the presence of pathogens. (LS-11-1) Explain how environmental factors can influence heredity or development of organisms. (LS-11-10) Explore and explain any given technology that may have a different value for different groups of people and at different points in time (e.g., new varieties of farm plants and animals have been engineered by manipulating their genetic instructions to reproduce new characteristics). (ST-11-3) Explain why basic concepts and principles of science and technology should be a part of active debate about the economics, policies, politics and ethics of various science-related and technology-related challenges. (ST-11-4)	**Local Objectives** *(type as bullets)* Students will be able to: • Identify the parts of a seed and the functions of those parts • Prepare a medium for seeds, sow seeds and provide the proper conditions for germination • Water, fertilize and harden off seedlings before transplanting • Transplant seedlings into flats or containers • Grow a variety of plants to a saleable product • Propagate several different plants from cuttings • Explain why rooting hormones are used and demonstrate the use of them • Demonstrate the process of taking cuttings from parent plants… both hardwood and softwood • Grow a variety off cuttings to mature rooted plants • Describe the process of separation and division and explain the major difference between them • Identify plant structures used in separation or

considerations affect the progress of science and technology. (SW-11-C)	Recognize that populations can reach or temporarily exceed the carrying capacity of a given environment. Show that the limitation is not just the availability of space but the number of organisms in relation to resources and the capacity of earth systems to support life. (LS 11-8) Formulate testable hypotheses. Develop and explain the appropriate procedures, controls and variables (dependent and independent) in scientific experimentation. (SI-11-1) Evaluate assumptions that have been used in reaching scientific conclusions. (SI-11-2) Design and carry out scientific inquiry (investigation), communicate and critique results through peer review. (SI-11-3) Explain why the methods of an investigation are based on the questions being asked. (SI-11-4) Summarize data and construct a reasonable argument based on those data and other known information. (SI-11-5) Describe advances in life sciences that have important, long-lasting effects on science and society (e.g., biotechnology). (LS-12-13)	divisions such as bulbs, tubers, rhizomes • List reasons that horticulturalists would use grafting techniques • Describe situations where layering would be used to propagate plants • Conduct experiments to demonstrate these techniques of propagation ***Teaching Resources*** • Various seeds for seedling growth experimentation… such as tomato, pepper, basil, squash, cucumber etc. • Various plants that can be used for cuttings… such as coleus, geraniums, tradescantia, spider plants, sanseveria, pothos, etc. • Rooting hormone • Pots, Flats, cell packs and clear lids • Potting mixes • Starter fertilizers • Light stands • Bulbs and tubers of flowers • Variety of plug trays of flowers… contact Green Circle Growers, Oberlin Ohio • DVD on Propagation Techniques… Seeds and Vegetative techniques • Chapters 6-12 of text

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Lakewood City Schools Science Course of Study – Eleventh and Twelfth Grade

SUBJECT: Horticulture

UNIT: Five: Crafts and Floral Design

11-12 Benchmarks	Grade Level Indicators	Instructional Objectives
	By the end of Twelfth Grade, the student will:	**Local Objectives** Students will be able to: • Identify different materials to use in making holiday decorations • Construct a holiday wreath, centerpiece, variety of bows, floral design, corsage or boutonnieres • Describe how to keep decorations fresh for extended periods of time • Describe several types of floral designs • Identify different flowers used in creating floral arrangements • Present their project to the class and use principles presented in the text • ***Teaching Resources*** • Variety of flowers and plant material for use during project. Contact local floral shops for older supplies at a discount price.

		• Floral foam and oasis block • Shears, floral wire, containers, ribbon, bows, pins, wreath frames, and other supplies for construction of project. Pat Catans is an excellent source but also request student donations. • Text chapters 46 through 50

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SUBJECT: Horticulture

UNIT Six: Container Planting and House Plants

Life Science Standards: LS

11-12 Benchmarks	Grade Level Indicators	Instructional Objectives
Explain how the molecular basis of life and the principles of genetics determine inheritance. (LS-11-C) Explain the interconnectedness of the components of a natural system. (LS-11-E) Explain how humans are connected to and impact natural systems. (LS-11-B)	Describe how the maintenance of a relatively stable internal environment is required for the continuation of life, and explain how stability is challenged by changing physical, chemical and environmental conditions as well as the presence of pathogens. (LS-11-1) Explain how environmental factors can influence heredity or development of organisms. (LS-11-10)	**Local Objectives** Students will be able to: • Design a terrarium and identify plants that could be used in one • Explain several conditions that affect growth of plants in terrariums • List and describe insects or diseases that affect terrariums • Explain the purpose and general technique of bonsai • List the eight steps in the construction of bonsai • List major concerns when caring for interior plants • Identify at least 25 commonly used houseplants and their conditions for growth • Fertilize and water houseplants appropriately • Explain the importance of container grown plants to the horticulture industry • Describe advantages and disadvantages to container grown nursery plants • Describe the correct method to transplant container grown plants • List the features to look for when purchasing container grown plants for personal use

		Teaching Resources • Specimens of many houseplants…minimum of 30 to use for identification activity • Guides that list characteristics of each plant • Samples of terrarium containers • Sphagnum moss, charcoal, pea gravel, and sand • Samples of Bonsai and containers used for creating Bonsai • Video Container gardening • Video Bonsai • Plants that can be transplanted into other containers • Text chapters 21-25

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Lakewood City Schools Science Course of Study – Eleventh and Twelfth Grade

SUBJECT: Horticulture

UNIT Seven: Growing of vegetables and small fruits

Life Science Standards LS
Earth Science Standards ES
Scientific Ways Of Knowing Standards SW

11-12 Benchmarks	**Grade Level Indicators**	**Instructional Objectives**
Explain that humans are an integral part of the Earth's system and the choices humans make today impact natural systems in the future. (ES-11-C) Explain how humans are connected to and impact natural systems. (LS-11-B) Explain how the molecular basis of life and the principles of genetics determine inheritance. (LS-11-C) Relate how biotic and abiotic global changes have occurred in the past and will continue to do so in the future. (LS-11-D)	**By the end of Twelfth Grade, the student will:** Explain heat and energy transfers in and out of the atmosphere and its involvement in weather and climate (radiation, conduction, convection and advection). (ES-11-3) Explain ways in which humans have had a major effect on other species (e.g., the influence of humans on other organisms occurs through land use, which decreases space available to other species and pollution, which changes the chemical composition of air, soil and water). (ES-11-12) Conclude that Earth has finite resources and explain that humans deplete some resources faster than they can be renewed. (ES-11-14) Explain how natural and human-induced hazards present the need for humans to assess potential danger and risk.	**Local Objectives** *(type as bullets)* Students will be able to: • List four items to consider when choosing the location of a vegetable or small fruit garden • Draw a scale model of a garden with at least four different vegetables or small fruits • Describe how to prepare a planting bed • Know the growth requirements of selected plants • Use a climate zone map to select types of plants and when to plant them • Explain why some plants are started from seed in the garden while others are transplanted into the garden as a seedling • Describe how to construct a cold frame and explain its purpose • Summarize two method for extending the growing season such as water filled teepees and row covers • Transplant a seedling correctly • Summarize steps of caring for the garden which

Explain the interconnectedness of the components of a natural system. (LS-11-E) Explain how human choices today will affect the quality and quantity of life on earth. (LS-11-F)	Many changes in the environment designed by humans bring benefits to society as well as cause risks (SW-11-9). Describe costs and trade-offs of various hazards – ranging from those with minor risk to a few people, to major catastrophes with major risk to many people. The scale of events and the accuracy with which scientists and engineers can (and cannot) predict events are important considerations. (SW-11-10)	include watering, seedling care, mulching, fertilizing, weed control, pest control and disease control • Identify several common insect pests of the garden • Identify methods of pest control chemical and organic and associated risks • Research different commonly grown vegetables or small fruits • Explain the growth and care of strawberries, blueberries, raspberries, and grapes • Describe the pH scale and its importance to growing blueberries • Sketch and explain the Kniffen system for pruning grapes • ***Teaching Resources*** • Video Vegetable Gardening by Hometime or similar video from other sources • Video Square Foot Gardening • LRC and computer lab for research • Extension office handouts on various commonly grown garden plants • Samples of various fertilizers, mulches and gardening tools • Sample of a cold frame, water filled tepee and row cover

		• Locations on school grounds where demonstrations could be done • Variety of seeds for display • Climate Zone Map • Gardening Catalogs for exploration and explanation of different plants • Sample plants • Textbook chapters 38 through 45

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Lakewood City Schools Science Course of Study – Eleventh and Twelfth Grade

SUBJECT: Horticulture

UNIT Eight: Plants in the landscape including pruning and care

Life Science Standards: LS
Earth Science Standards: ES
Scientific Inquiry Standards: SI

11-12 Benchmarks	Grade Level Indicators	Instructional Objectives
Explain that humans are an integral part of the Earth's system and the choices humans make today impact natural systems in the future. (ES-11-C) Explain how humans are connected to and impact natural systems. Explain the interconnectedness of the components of a natural system. (LS-11-E) Make appropriate choices when designing and participating in scientific investigations by using cognitive and manipulative skills when collecting data and formulating conclusions from the data. (SI-11-	**By the end of Twelfth Grade, the student will:** Describe how the maintenance of a relatively stable internal environment is required for the continuation of life, and explain how stability is challenged by changing physical, chemical and environmental conditions as well as the presence of pathogens. (LS-11-1) Investigate the impact on the structure and stability of ecosystems due to changes in their biotic and abiotic components as a result of human activity. (LS 11-5) Predict some possible impacts on an ecosystem with the introduction of a non-native species. (LS-11-6) Recognize that populations can reach or temporarily exceed the carrying capacity of a given environment. Show that the limitation is not just the availability of space but the number of organisms in relation to resources and the capacity of earth systems to support life. (LS 11-8) Give examples of how human activity can accelerate rates of natural change and can have unforeseen	**Local Objectives** Students will be able to: • Identify uses of annuals and perennials in the landscape • Explain and prepare a bed for planting • Demonstrate correct transplanting techniques • Differentiate between annuals and perennials and give examples of each • Grow plugs of various annuals to completion • Design an experiment to show affect that different environments have on growth. • List uses of evergreen type plants in the landscape • Differentiate between pines and spruces • Identify several narrow leaf evergreens and several broadleaf evergreens • List the six functions of deciduous trees in the landscape • Describe how to plant a bare root, balled and burlapped or containerized tree • Explain how and why guying is done • Research different types of landscape plants and their

	consequences. (LS –11-9) Explain how environmental factors can influence heredity or development of organisms. (LS-11-10) Recognize that ecosystems change when significant climate changes occur or when one or more new species appear as a result of immigration or speciation. (LS-11-12) Formulate testable hypotheses. Develop and explain the appropriate procedures, controls and variables (dependent and independent) in scientific experimentation. (SI-11-1) Evaluate assumptions that have been used in reaching scientific conclusions. (SI-11-2) Design and carry out scientific inquiry (investigation), communicate and critique results through peer review. (SI-11-3) Explain why the methods of an investigation are based on the questions being asked. (SI-11-4) Summarize data and construct a reasonable argument based on those data and other known information. (SI-11-5)	uses • List several deciduous shrubs and groundcovers and describe their uses in the landscape • List and describe several plants grown from bulbs and methods for planting • Differentiate between summer flowering bulbs and spring flowering bulbs • List five reasons for pruning • Identify different pruning tools • Demonstrate how to prune a variety of trees and shrubs correctly • List the major principles of landscape design • Calculate the amount of mulch needed in a landscape • Create a Landscape plan drawn to scale by applying knowledge from this unit ***Teaching Resources*** • Plug trays of various annuals • Samples of various perennials • Samples of bulbs • Flats, cell packs and potting soil • Locations on school grounds for the planting of some of these plants • Light stands • Tree model for pruning demonstrations • Actual trees or shrubs on grounds that can be

		pruned • Activity… Designing your dream landscape • Graph paper • If possible, order some bare root stock and bulbs to use for demonstration • Collection of tools to be used for pruning and for identification purposes • Textbook chapters 25 through 34 • Video Pruning Techniques • Video Pruning Fruit trees • Video Trees and Shrubs • Video Growing and Pruning roses

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SUBJECT: Horticulture

UNIT Nine: Establishing and maintaining a lawn

Life Science Standards: LS
Earth Science Standards: ES
Scientific Inquiry Standards: SI
Scientific Ways of Knowing Standards: SW

11-12 Benchmarks	Grade Level Indicators	Instructional Objectives
Explain how humans are connected to and impact natural systems. (LS-11-B) Explain the interconnectedness of the components of a natural system. (LS-11-E) Make appropriate choices when designing and participating in scientific investigations by using cognitive and manipulative skills when collecting data and formulating conclusions from the data. (SI-11-A	**By the end of Twelfth Grade, the student will:** Explain how interactions among Earth's lithosphere, hydrosphere, atmosphere and biosphere have resulted in the ongoing changes of the Earth's system. (ES-11-6) Explain ways in which humans have had a major effect on other species (e.g., the influence of humans on other organisms occurs through land use, which decreases space available to other species and pollution, which changes the chemical composition of air, soil and water). (ES-11-12) Explain how human behavior affects the basic processes of natural ecosystems and the quality of the atmosphere, hydrosphere and lithosphere. (ES-11-13) Predict some possible impacts on an ecosystem with the introduction of a non-native species. (LS-11-6) Formulate testable hypotheses. Develop and explain the	**Local Objectives)** Students will be able to • List three reasons for establishing a lawn • Describe necessary steps to prepare the soil for planting turf grass • Analyze a seed bag sample for needed information • List steps to establish a lawn from bare soil • Distinguish between sowing seed, sodding, and plugging • Identify common grasses of this area • Describe several of the steps to maintaining a quality lawn in their neighborhood • Explain how to apply fertilizer, and pesticides to a lawn for optimum growth • Analyze differences between starter fertilizer, regular lawn fertilizer and winterizer fertilizer • Describe steps to renovate a lawn or isolated sections of a lawn • Identify if a lawn has a thatch problem • Identify common problems of lawns

	appropriate procedures, controls and variables (dependent and independent) in scientific experimentation. (SI-11-1) Summarize data and construct a reasonable argument based on those data and other known information. (SI-11-5) Explain how natural and human-induced hazards present the need for humans to assess potential danger and risk. Many changes in the environment designed by humans bring benefits to society as well as cause risks (SW-11-9).	• Conduct an experiment to demonstrate the effectiveness of fertilizers and herbicides on turf grass ***Teaching Resources*** • Video Yardening: Lawn Care • Samples of lime, fertilizer, and pesticides • Samples of different grass / seeds • Location on grounds to run an experiment on the effectiveness of fertilizers / pesticides and or renovation project • Sample of Japanese Beetle Grub life cycle • Text chapters 35 through 37

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SUBJECT: Horticulture

UNIT 10: Pest management

Life Science Standards: LS
Earth Science Standards: ES
Scientific ways of Knowing Standards: SW

11-12 Benchmarks	**Grade Level Indicators**	**Instructional Objectives**
Explain how humans are connected to and impact natural systems. (LS-11-B) Explain the interconnectedness of the components of a natural system. (LS-11-E)	**By the end of Twelfth Grade, the student will:** Explain how natural and human-induced hazards present the need for humans to assess potential danger and risk. Many changes in the environment designed by humans bring benefits to society as well as cause risks (SW-11-9). Explain ways in which humans have had a major effect on other species (e.g., the influence of humans on other organisms occurs through land use, which decreases space available to other species and pollution, which changes the chemical composition of air, soil and water). (ES-11-12) ***Explain how human behavior affects the basic processes of natural ecosystems and the quality of the atmosphere, hydrosphere and lithosphere. (ES-11-13)*** Investigate the impact on the structure and stability of	**Local Objectives** *(type as bullets)* Students will be able to • Explain what biological integrated pest management means. • List benefits of biological control of plant diseases or insect pests without man-made chemicals • Explain the risks of placing a new species into an area for biological control • Identify the three ways that pesticides can enter a body • Identify types of pesticides and their uses • List several safety precautions to avoid accidental poisonings • Describe correct application methods • Read pesticide labels and identify a variety of important information • Match pesticide names according to type (herbicide, insecticide, fungicide • Identify the safety signal words on pesticide label

	ecosystems due to changes in their biotic and abiotic components as a result of human activity. (LS 11-5) Predict some possible impacts on an ecosystem with the introduction of a non-native species. (LS-11-6) Give examples of how human activity can accelerate rates of natural change and can have unforeseen consequences. (LS –11-9) Explain how natural and human-induced hazards present the need for humans to assess potential danger and risk. Many changes in the environment designed by humans bring benefits to society as well as cause risks (SW-11-9).	and describe what they mean • Identify different diseases and insect pests • Describe how pesticides kill the intended pest • Summarize what is meant by an LD50 value • Analyze the benefits and risks of using pesticides ***Teaching Resources*** (type below last local obejective*)* • Samples of various pesticides such as Sevin, Malathion, Daconil, Roundup etc. and their labels • Pesticide label activity • Pictures or samples of various pests / diseases for identification • Duster applicator • Sprayer applicator • Safety equipment • Ortho problem solver book … useful for pest pictures • Text chapters 16 - 20

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Lakewood City Schools Science Course of Study –Eleventh and Twelfth Grade

SUBJECT: Horticulture

UNIT Eleven: Greenhouse Management

11-12 Benchmarks	Grade Level Indicators	Instructional Objectives
No real benchmarks here, but this unit represents ongoing experimentation or growth of plants mentioned in this unit as well as others. The greenhouse will be used as a place to grow seasonal plants for sale to students and staff at reasonable prices. Funds raised will assist in ongoing costs of the operation of the greenhouse such as everyday consumable items as well as other larger purchases.		**Local Objectives** Students will be able to • Participate in the ongoing care and maintenance of the greenhouse • Identify many of the plants in the greenhouse at various times • Monitor the growth of poinsettias, forced bulbs, Easter lilies, and many annuals and vegetable plants • Monitor growth of plants in the Hydroponic units • Explain the operation of the Hydroponic units and be able to perform maintenance on them • Identify equipment in use • Water plants appropriately • Perform deadheading and other general plant maintenance • Identify insect and diseases as they appear and explain ways to control them • Explain the importance of cleanliness, temperature, and air flow to quality plant growth • Create a planter using available plants ***Teaching Resources***

		• Watering equipment • Pruners • Containers of various sizes • Flats, cell packs, clear lids and light stands • Tables and trays • Soilless mixes, peat moss and potting mixes appropriate for different plants • Fertilizers • Purchased plants at appropriate times from Uncle John's plant farm (poinsettias and lilies) and Green Circle growers (annuals) • Purchased bulbs from any local supplier (mail order through Leo Burbee bulb company) • Seeds of desired plants • Storage capability • Book titled All about Greenhouses by Ortho • Text Chapters 13 and 15