

CIMC CURRICULUM

HORTICULTURE

Embedded PASS Core Curriculum

- ◆ Science-----Met minimal to moderate PASS requirements

CIMC CURRICULUM

HORTICULTURE

TABLE OF CONTENTS

Science: Physical Science

Science: Biology

Science: Chemistry

Science: Physics

Summary

*Addendum

*Supplement Sample

*The initial crosswalk analysis suggested these sections be noted as “N/A”

HORTICULTURE

SCIENCE

PHYSICAL SCIENCE

**Oklahoma Career Tech Curriculum:
Embedded PASS Skills**

Horticulture: Science

**CIMC Developed/
Recommended Curriculum:** Horticulture

**PASS Skills (May 2000 Version)
Core Curriculum Area:** Science

PASS Skills Sub-Core: Physical Science

**PASS Content Standard Area I.
Observing and Measuring**

Content Skill Knowledge

Matching Curriculum Objectives

<p>A. Identify similar or different characteristics in a given set of objects, organisms, or events.</p>	<p>4:7 Name the type of fire extinguisher required to put out specific types of fires.</p> <p>8:3 Match common wire sizes to their correct uses.</p> <p>13:1 Label components of complete fertilizer formula (Guaranteed analysis).</p>
<p>B. Select qualitative (descriptive) or quantitative (numerical) observations in a given set of objects, organisms, or events.</p>	<p>1:11 Calculate mix ratios.</p> <p>4:10 Distinguish between voltage applications.</p>

	<p>8:3 Match common wire sizes to their correct uses.</p> <p>11:1 Select from a list true statements about the importance of pH values.</p> <p>12:2 List composition ratios of an average soil particle.</p> <p>12:4 Distinguish among types of soil particles.</p> <p>12:8 State pH values for soil types.</p> <p>12:12 Test soil pH value with litmus paper.</p>
<p>C. (5-00 Update) Identify qualitative (descriptive) or quantitative (numerical) changes given conditions before, during, or after an event.</p>	<p>13:11 Use fertilizer label and ppm to calculate amount of dry fertilizer to be added to an injector system tank.</p>
<p>D. Use the appropriate Systems International (SI) units (grams, meters, liters, and degrees Celsius) to measure objects, organisms, or events.</p>	<p>1:7 Match standard measures to their equivalents.</p> <p>1:8 Solve conversion problems.</p> <p>1:9 Write the basic formulas for surface area, area of a triangle, and volume.</p>

	<p>1:10 Solve problems using the formulas for area and volume.</p> <p>1:11 Calculate mix ratios.</p> <p>1:12 Solve problems for basic mix ratios.</p> <p>14:6 Create zone and frost-date charts.</p>
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PASS Skills Sub-Core: Physical Science

**PASS Content Standard Area II.
Classifying**

Content Skill Knowledge

Matching Curriculum Objectives

<p>A. Use observable properties to classify a set of objects, organisms, or events.</p>	<p>4:7 Name the type of fire extinguisher required to put out specific types of fires.</p>
<p>B. Identify the properties on which a given classification system is based.</p>	<p>13:7 State rules for storing fertilizer bags.</p> <p>13:9 Select from a list information required on fertilizer bags.</p> <p>13:10 Analyze information required on fertilizer bags.</p>
<p>C. Place an object, organism or event into a classification system.</p>	<p>**See supplement booklet to meet this PASS requirement.**</p>

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Horticulture: Science

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PASS Skills Sub-Core: Physical Science

PASS Content Standard Area III. Experimenting

Content Skill Knowledge

Matching Curriculum Objectives

<p>A. Arrange the steps of a scientific problem in logical order.</p>	<p>**See supplement booklet to meet this PASS requirement.**</p>
<p>B. Identify the independent variables, dependent variables, and control in an experimental set-up.</p>	<p>**See supplement booklet to meet this PASS requirement.**</p>
<p>C. Use mathematics to show relationships within a given set of observations.</p>	<p>6:10 Calculate the water quantity for bench plants using an automatic watering system.</p> <p>6:11 Calculate the amount of fertilizer for a proportioning pump in an automatic watering system and a hand-held hozon.</p> <p>6:20 Check water temperature, water by hand, and leach soil.</p>

D. Identify a hypothesis for a given problem.	**See supplement booklet to meet this PASS requirement.**
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PASS Skills Sub-Core: Physical Science

**PASS Content Standard Area IV.
Interpreting**

Content Skill Knowledge

Matching Curriculum Objectives

<p>A. Select appropriate predictions based on previously observed patterns of evidence.</p>	<p>6:10 Calculate the water quantity for bench plants using an automatic watering system.</p> <p>6:11 Calculate the amount of fertilizer for a proportioning pump in an automatic watering system and a hand-held hozon.</p> <p>11:5 Describe the advantages of a soilless mixture.</p>
<p>B. Report data in an appropriate manner.</p>	<p>6:13 Create a line drawing of a design for an automatic watering system, label all parts, and prescribe system maintenance.</p>

	<p>12:2 List composition ratios of an average soil particle.</p> <p>12:3 Describe soil texture.</p> <p>12:5 Calculate soil type.</p> <p>14:6 Create zone and frost-date charts.</p>
<p>C. Predict data points not included on a given graph.</p>	<p>13:11 Use fertilizer label and ppm to calculate amount of dry fertilizer to be added to an injector system tank.</p> <p>14:6 Create zone and frost-date charts.</p>
<p>D. Interpret line, bar, and circle graphs.</p>	<p>13:11 Use fertilizer label and ppm to calculate amount of dry fertilizer to be added to an injector system tank.</p> <p>14:6 Create zone and frost-date charts.</p>
<p>E. Identify data that support or reject stated hypothesis.</p>	<p>10:5 Distinguish between acute and chronic toxicity.</p> <p>10:6 Define oral, dermal, and inhalation toxicity.</p> <p>21:6 State general soil type and pH range for garden soils.</p>

<p>F. Accept or reject hypothesis when given results of an investigation.</p>	<p>10:5 Distinguish between acute and chronic toxicity.</p> <p>10:6 Define oral, dermal, and inhalation toxicity.</p>
<p>G. Identify discrepancies between stated hypothesis and actual results.</p>	<p>10:5 Distinguish between acute and chronic toxicity.</p> <p>10:6 Define oral, dermal, and inhalation toxicity.</p>
<p>H. Select the most logical conclusion for given experimental data.</p>	<p>10:5 Distinguish between acute and chronic toxicity.</p> <p>10:6 Define oral, dermal, and inhalation toxicity.</p>

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**PASS Content Standard Area V.
Communicating**

Content Skill Knowledge

Matching Curriculum Objectives

<p>A. Prepare a written report describing the sequence, results, and interpretation of an investigation or event.</p>	<p>**See supplement booklet to meet this PASS requirement.**</p>
<p>B. Communicate and defend a scientific argument.</p>	<p>11:5 Describe the advantages of a soilless mixture.</p> <p>12:10 Recommend treatments for pH problems in soils.</p>
<p>C. Identify or create an appropriate graph or chart from collected data, table, or written description.</p>	<p>**See supplement booklet to meet this PASS requirement.**</p>

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PASS Skills Sub-Core: Physical Science

**PASS Content Standard Area VI.
Modeling**

Content Skill Knowledge

Matching Curriculum Objectives

<p>A. Select a model, which explains a given set of observations.</p>	<p>4:12 Match electrical protection devices to their correct descriptions.</p> <p>10:15 Select from a list true statements about the information on a hazardous materials classification card.</p> <p>11:4 Match characteristics of materials used in mixing soil media to their correct</p>
<p>B. Select predictions based on models.</p>	<p>13:2 Distinguish values of essential plant food elements nitrogen, phosphorus, and potassium.</p>

<p>C. Compare a given model to the real world.</p>	<p>4:12 Match electrical protection devices to their correct descriptions.</p> <p>11:4 Match characteristics of materials used in mixing soil media to their correct</p>
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**PASS Content Standard Area VII.
Safety in the Science Classroom**

Content Skill Knowledge

Matching Curriculum Objectives

<p>A. Recognize potential hazards within a science activity.</p>	<p>3:1 State safety rules for using hand tools.</p> <p>3:7 Respond to scenarios involving hand-tool safety rules.</p> <p>3:8 State fuel safety practices for power equipment.</p> <p>3:10 State safety rules for operating power equipment.</p> <p>3:12 State safety rules for operating electric power tools.</p>
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	<p>3:15 State safety rules for specific pieces of equipment.</p> <p>4:1 State the major causes of accidents.</p> <p>4:2 State general job-safety rules.</p> <p>4:4 Describe the purpose of protective clothing.</p> <p>4:5 Complete statements about dress precautions.</p> <p>4:6 Distinguish among federal safety code colors.</p> <p>4:7 Name the type of fire extinguisher required to put out specific types of fires.</p> <p>4:9 Select from a list precautions to avoid a lightning strike.</p> <p>4:10 Distinguish between voltage applications.</p> <p>4:11 Complete electrical safety rules.</p> <p>4:14 Complete safety rules for using tools.</p>
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	<p>4:15 State safety rules for the work area.</p> <p>10:8 State chemical safety precautions.</p> <p>10:10 Complete statements about the importance of protective clothing and equipment.</p>
<p>B. Practice safety procedures in all science activities.</p>	<p>3:6 Match correct use of the body with specific tools.</p> <p>3:9 Respond to scenarios involving fuel safety rules.</p> <p>3:11 Respond to scenarios involving power tool safety rules.</p> <p>3:13 Respond to scenarios involving safety rules for operating electric power</p> <p>3:16 Respond to scenarios involving safety rules for specific pieces of equipment.</p> <p>4:8 Operate a fire extinguisher.</p> <p>4:12 Match electrical protection devices to their correct descriptions.</p>

	<p>4:13 Label three-wire receptacles.</p> <p>10:9 Complete statements about personal safety precautions for handling chemicals.</p> <p>10:13 Select from a list true statements concerning guidelines for hazardous waste disposal.</p> <p>10:17 Clean chemical containers for disposal.</p>
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**PASS Content Standard Area VIII.
Inquiry**

Content Skill Knowledge Matching Curriculum Objectives

<p>A. Formulate a testable hypothesis and design an appropriate experiment relating to the world.</p>	<p>**See supplement booklet to meet this PASS requirement.**</p>
<p>B. Design and conduct scientific investigations in which variables are identified and controlled.</p>	<p>**See supplement booklet to meet this PASS requirement.**</p>
<p>C. Use a variety of technologies, such as hand tools, measuring instruments, and computers to collect, analyze, and display data.</p>	<p>12:12 Test soil pH value with litmus paper.</p> <p>13:11 Use fertilizer label and ppm to calculate amount of dry fertilizer to be added to an injector system tank.</p>

<p>D. Inquiries should lead to the formation of explanations or models (physical, conceptual, and mathematical). In answering questions, students should engage in discussions (based on scientific knowledge, the use of logic, and evidence from the investigations) and arguments that encourage the revision of their explanations, leading to further inquiry.</p>	<p>4:12 Match electrical protection devices to their correct descriptions.</p> <p>10:15 Select from a list true statements about the information on a hazardous materials classification card.</p> <p>11:4 Match characteristics of materials used in mixing soil media to their correct Descriptions.</p>
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**PASS Content Standard Area IX.
Structure and Properties of Matter**

Content Skill Knowledge	Matching Curriculum Objectives
A. Matter is made up of minute particles called atoms, and atoms are composed of even smaller components.	**See supplement booklet to meet this PASS requirement.**
B. An element is composed of a single type of atoms. When elements are listed in order according to the number of protons (called the atomic number), repeating patterns of physical and chemical properties identify families of elements with similar properties.	**See supplement booklet to meet this PASS requirement.**
C. Matter has characteristic properties, such as boiling points, melting points, solubility, and density, which distinguish pure substances and can be used to separate one substance from another.	**See supplement booklet to meet this PASS requirement.**

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PASS Content Standard Area X. Chemical Reactions

Content Skill Knowledge

Matching Curriculum Objectives

<p>A. Substances react chemically in characteristic ways with other substances to form new substances (compounds) with different characteristic properties. In chemical reactions, the total mass is conserved.</p>	<p>10:3 Match the ways chemical controls work to their correct descriptions.</p> <p>10:4 Match types of chemical control applications to their correct descriptions.</p>
<p>B. The rate of chemical reactions is affected by the concentration and temperature of the reacting material.</p>	<p>**See supplement booklet to meet this PASS requirement.**</p>

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**PASS Content Standard Area XI.
Motion and Forces**

Content Skill Knowledge

Matching Curriculum Objectives

<p>A. Objects change their motion only when a net force is applied. Laws of motion are used to determine the effects of forces on the motion of objects.</p>	<p>**See supplement booklet to meet this PASS requirement.**</p>
<p>B. Gravitation is a universal force that each mass exerts on any other mass.</p>	<p>**See supplement booklet to meet this PASS requirement.**</p>

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**PASS Content Standard Area XII.
Interactions of Energy and Matter**

Content Skill Knowledge

Matching Curriculum Objectives

<p>A. All energy can be considered to be either kinetic energy, which is the energy of motion: potential energy, which depends on relative position: or energy contained by a field, such as electromagnetic waves.</p>	<p>**See supplement booklet to meet this PASS requirement.**</p>
<p>B. Waves, including sounds and seismic waves, waves on water, and light waves, have energy and can transfer energy when they interact with matter.</p>	<p>**See supplement booklet to meet this PASS requirement.**</p>

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**PASS Content Standard Area XIII.
The Earth System**

Content Skill Knowledge

Matching Curriculum Objectives

<p>A. Geologic time can be estimated by observing rock sequences and using fossils to correlate the sequences at various locations.</p>	<p>**See supplement booklet to meet this PASS requirement.**</p>
<p>B. The solid crust of the earth consist of separate plates that move very slowly pressing against one another in some places and pulling apart in other places.</p>	<p>**See supplement booklet to meet this PASS requirement.**</p>

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**PASS Content Standard Area XIV.
The Universe**

Content Skill Knowledge

Matching Curriculum Objectives

<p>A. The stars differ from each other in size, temperature, and age, but they appear to be made up of the same elements that are found on the earth.</p>	<p>**See supplement booklet to meet this PASS requirement.**</p>
<p>B. Stars condense by gravity out of clouds of molecules of the lightest elements until nuclear fusion of the light elements into heavier ones began to occur. Fusion released great amounts of energy over millions of years. Eventually, some stars exploded, producing clouds of heavy elements from which other stars and planets could later condense. The process of star formation and destruction continues.</p>	<p>**See supplement booklet to meet this PASS requirement.**</p>

HORTICULTURE

SCIENCE

BIOLOGY

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PASS Skills Sub-Core: Biology

**PASS Content Standard Area I.
Observing and Measuring**

Content Skill Knowledge

Matching Curriculum Objectives

<p>A. Identify similar or different characteristics in a given set of objects, organisms, or events.</p>	<p>1:1 Match the branches and divisions of the horticultural tree to their definitions.</p> <p>1:6 Distinguish among plant nomenclature and taxonomy terms.</p> <p>2:1 Match careers in horticulture to their correct descriptions.</p> <p>5:1 Match structural parts of a greenhouse to their descriptions.</p> <p>6:3 Match types of watering equipment to their descriptions.</p>
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	<p>6:14 List the advantages and disadvantages of hand watering.</p> <p>7:1 Match the primary parts of a plant to their correct descriptions.</p> <p>7:2 Label primary parts of a plant.</p> <p>7:3 Label parts of monocot and dicot vascular systems.</p> <p>7:4 Match parts of monocot and dicot vascular systems to their correct descriptions.</p> <p>7:6 Match parts of a complete flower to their correct descriptions.</p> <p>7:7 Label parts of a complete flower.</p> <p>8:8 Identify basic types of floral arrangements.</p> <p>8:10 List characteristics of common cut flowers and foliage used in floral design.</p> <p>9:1 List features used to identify deciduous plants.</p>
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	<p>9:2 Label the parts of a leaf of a deciduous plant.</p> <p>9:3 Label types of leaves associated with deciduous plants.</p> <p>9:4 Label common deciduous leaf arrangements.</p> <p>9:5 Identify leaf characteristics of deciduous plants.</p> <p>9:7 Label deciduous plant forms.</p> <p>10:7 List symptoms of pesticide poisoning.</p> <p>14:10 List types of seeds available.</p> <p>14:20 Match types of stem cuttings to the proper season for taking cuttings.</p> <p>17:1 List features used to identify evergreens.</p> <p>17:4 Label types of leaves associated with narrow-leaved evergreens.</p>
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	<p>19:2 Match types of trees or shrubs to their proper pruning times.</p> <p>19:3 Match tools used for pruning to their correct uses.</p> <p>19:5 Match parts of a tree structure to their correct descriptions.</p>
<p>B. Select qualitative (descriptive) or quantitative (numerical) observations in a given set of objects, organisms, or events.</p>	<p>1:4 Arrange in order the levels of the horticultural career ladder.</p> <p>2:6 Identify places that hire horticulturists.</p> <p>5:4 Distinguish among characteristics of greenhouse covering materials.</p> <p>5:6 Match characteristics of greenhouse benches and beds to their descriptions.</p> <p>6:7 Complete statements about determining water quantity.</p> <p>6:10 Calculate the water quantity for bench plants using an automatic watering system.</p>

	<p>6:11 Calculate the amount of fertilizer for a proportioning pump in an automatic watering system and a hand-held hozon.</p> <p>6:12 Select true statements about water quality and temperature.</p> <p>6:18 Check moisture levels.</p> <p>7:5 Describe types of root systems.</p> <p>7:11 Diagnose plant environmental problems and recommend solutions.</p> <p>7:13 Diagnose plant nutritional problems.</p> <p>8:10 List characteristics of common cut flowers and foliage used in floral design.</p> <p>9:5 Identify leaf characteristics of deciduous plants.</p> <p>9:6 Describe types of flowers on deciduous plants.</p> <p>9:9 List qualities to consider when selecting a deciduous plant for a landscape.</p>
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	<p>10:5 Distinguish between acute and chronic toxicity.</p> <p>11:1 Select from a list true statements about the importance of pH values.</p> <p>11:3 Select from a list true statements about porosity.</p> <p>11:4 Match characteristics of materials used in mixing soil media to their correct descriptions.</p> <p>12:2 List composition ratios of an average soil particle.</p> <p>12:4 Distinguish among types of soil particles.</p> <p>12:8 State pH values for soil types.</p> <p>12:12 Test soil pH value with litmus paper.</p> <p>13:2 Distinguish values of essential plant food elements nitrogen, phosphorus, and potassium.</p> <p>13:5 Describe types of commercial fertilizers.</p>
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	<p>13:11 Use fertilizer label and ppm to calculate amount of dry fertilizer to be added to an injector system tank.</p> <p>14:3 Arrange in order the steps in germination.</p> <p>14:19 Match types of asexual propagation methods for nursery operations to their correct descriptions.</p> <p>14:20 Match types of stem cuttings to the proper season for taking cuttings.</p> <p>14:27 Distinguish among types of grafts used in nursery production.</p> <p>15:5 Place plants according to their lighting requirements.</p> <p>15:6 Select from a list characteristics of sick plants.</p> <p>17:10 Select true statements regarding narrow-leaved and broad-leaved evergreens.</p> <p>19:3 Match tools used for pruning to their correct uses.</p>
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	<p>19:7 Determine which parts of a tree to prune.</p> <p>20:7 Distinguish between advantages of raised bed planting methods and advantages of flat bed planting methods.</p> <p>20:8 Distinguish between advantages of direct seeding and advantages of transplanting.</p>
<p>C. (5-00 Version) Identify qualitative (descriptive) or quantitative (numerical) changes given conditions before, during, or after an event.</p>	<p>6:10 Calculate the water quantity for bench plants using an automatic watering system.</p> <p>6:11 Calculate the amount of fertilizer for a proportioning pump in an automatic watering system and a hand-held hoon.</p> <p>6:18 Check moisture levels.</p> <p>7:11 Diagnose plant environmental problems and recommend solutions.</p> <p>7:13 Diagnose plant nutritional problems.</p> <p>9:9 List qualities to consider when selecting a deciduous plant for a landscape.</p>

	<p>13:11 Use fertilizer label and ppm to calculate amount of dry fertilizer to be added to an injector system tank.</p> <p>15:5 Place plants according to their lighting requirements.</p> <p>19:7 Determine which parts of a tree to prune.</p>
<p>D. Use the appropriate Systems International (SI) units (grams, meters, liters, and degrees Celsius) to measure objects, organisms, or events.</p>	<p>1:7 Match standard measures to their equivalents.</p> <p>1:8 Solve conversion problems.</p> <p>6:10 Calculate the water quantity for bench plants using an automatic watering system.</p> <p>6:11 Calculate the amount of fertilizer for a proportioning pump in an automatic watering system and a hand-held hozon.</p> <p>6:20 Check water temperature, water by hand, and leach soil.</p> <p>7:8 Describe the process and formula for photosynthesis.</p>

	<p>7:9 Describe the process and formula for respiration.</p> <p>8:18 Create a symmetrical arrangement.</p> <p>8:19 Create an asymmetrical arrangement.</p> <p>12:8 State pH values for soil types.</p> <p>12:12 Test soil pH value with litmus paper.</p> <p>13:11 Use fertilizer label and ppm to calculate amount of dry fertilizer to be added to an injector system tank.</p> <p>18:7 Determine ball size.</p>
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PASS Skills Sub-Core: Biology

**PASS Content Standard Area II.
Classifying**

Content Skill Knowledge	Matching Curriculum Objectives
<p>A. Use observable properties to classify a set of objects, organisms, or events.</p>	<p>5:2 Match types of greenhouses to their descriptions and to their pictures.</p> <p>8:8 Identify basic types of floral arrangements.</p> <p>9:7 Label deciduous plant forms.</p> <p>15:1 Distinguish between types of indoor plants.</p> <p>15:7 Name common plant pests.</p> <p>16:2 Match types of potting containers to their correct descriptions.</p> <p>17:2</p>

	<p>Describe parts of a leaf of a broad-leaved evergreen.</p> <p>17:3 Describe types of leaves associated with broad-leaved evergreens.</p> <p>17:4 Label types of leaves associated with narrow-leaved evergreens.</p> <p>21:1 Describe life cycles of garden flowers.</p> <p>21:12 Select compatible varieties of flowers to be planted in full sun and partial shade.</p>
<p>B. Identify the properties on which a given classification system is based.</p>	<p>1:6 Distinguish among plant nomenclature and taxonomy terms.</p> <p>9:1 List features used to identify deciduous plants.</p> <p>9:3 Label types of leaves associated with deciduous plants.</p> <p>9:5 Identify leaf characteristics of deciduous plants.</p> <p>9:6 Describe types of flowers on deciduous plants.</p> <p>13:7</p>

	<p>State rules for storing fertilizer bags.</p> <p>13:9 Select from a list information required on fertilizer bags.</p> <p>13:10 Analyze information required on fertilizer bags.</p> <p>17:1 List features used to identify evergreens.</p>
<p>C. Place an object, organism or event into a classification system.</p>	<p>7:4 Match parts of monocot and dicot vascular systems to their correct descriptions.</p> <p>9:7 Label deciduous plant forms.</p> <p>10:2 Match common types of chemical controls used in horticulture to their correct descriptions.</p> <p>17:7 Label evergreen plant forms.</p> <p>19:5 Match parts of a tree structure to their correct descriptions.</p> <p>20:1 Match small fruits and vegetables to their proper classifications based on the part of the plant that consumers use.</p> <p>20:2</p>

	Match plant types to proper classifications based on their hardiness (freezing temperature tolerance).
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PASS Skills Sub-Core: Biology

PASS Content Standard Area III. Experimenting

Content Skill Knowledge

Matching Curriculum Objectives

<p>A. Arrange the steps of a scientific problem in logical order.</p>	<p>6:19 Determine watering frequency.</p> <p>7:11 Diagnose plant environmental problems and recommend solutions.</p> <p>7:13 Diagnose plant nutritional problems.</p> <p>10:7 List symptoms of pesticide poisoning.</p> <p>14:3 Arrange in order the steps in germination.</p> <p>14:11 Define methods of speeding germination.</p>
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	<p>21:7 Describe light exposure requirements and characteristics of ten species of annuals.</p> <p>21:8 Describe light exposure requirements and characteristics of two species of biennials.</p> <p>21:9 Describe light exposure requirements and characteristics of ten species of flowering perennials.</p> <p>21:10 Describe light exposure requirements and characteristics of five species of ground cover and vines.</p> <p>21:11 Describe light exposure, soil, and moisture requirements for three species of bulbs.</p> <p>21:12 Select compatible varieties of flowers to be planted in full sun and partial shade.</p>
<p>B. Identify the independent variables, dependent variables, and control in an experimental set-up.</p>	<p>6:19 Determine watering frequency.</p> <p>7:11 Diagnose plant environmental problems and recommend solutions.</p> <p>7:13 Diagnose plant nutritional problems.</p>

	<p>10:7 List symptoms of pesticide poisoning.</p> <p>14:3 Arrange in order the steps in germination.</p> <p>14:11 Define methods of speeding germination.</p> <p>21:7 Describe light exposure requirements and characteristics of ten species of annuals.</p> <p>21:8 Describe light exposure requirements and characteristics of two species of biennials.</p> <p>21:9 Describe light exposure requirements and characteristics of ten species of flowering perennials.</p> <p>21:10 Describe light exposure requirements and characteristics of five species of ground cover and vines.</p> <p>21:11 Describe light exposure, soil, and moisture requirements for three species of bulbs.</p>
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	<p>21:12 Select compatible varieties of flowers to be planted in full sun and partial shade.</p>
<p>C. Use mathematics to show relationships within a given set of observations.</p>	<p>6:10 Calculate the water quantity for bench plants using an automatic watering system.</p> <p>6:11 Calculate the amount of fertilizer for a proportioning pump in an automatic watering system and a hand-held hozon.</p> <p>6:20 Check water temperature, water by hand, and leach soil.</p>
<p>D. Identify a hypothesis for a given problem.</p>	<p>7:11 Diagnose plant environmental problems and recommend solutions.</p> <p>7:13 Diagnose plant nutritional problems.</p> <p>14:11 Define methods of speeding germination.</p> <p>21:7 Describe light exposure requirements and characteristics of ten species of annuals.</p> <p>21:8 Describe light exposure requirements and characteristics of two species of biennials.</p>

	<p>21:9 Describe light exposure requirements and characteristics of ten species of flowering perennials.</p> <p>21:10 Describe light exposure requirements and characteristics of five species of ground cover and vines.</p> <p>21:11 Describe light exposure, soil, and moisture requirements for three species of bulbs.</p>
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Horticulture: Science

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**PASS Skills (May 2000 Version)
Core Curriculum Area:** Science

PASS Skills Sub-Core: Biology

**PASS Content Standard Area IV.
Interpreting**

Content Skill Knowledge

Matching Curriculum Objectives

<p>A. Select appropriate predictions based on previously observed patterns of evidence.</p>	<p>4:16 Analyze greenhouse safety.</p> <p>6:9 Determine the watering needs of plants</p> <p>6:10 Calculate the water quantity for bench plants using an automatic watering system.</p> <p>6:11 Calculate the amount of fertilizer for a proportioning pump in an automatic watering system and a hand-held hozon.</p> <p>6:19 Determine watering frequency.</p>
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	<p>7:11 Diagnose plant environmental problems and recommend solutions.</p> <p>7:13 Diagnose plant nutritional problems.</p> <p>8:9 Recall uses, shapes, and examples of types of flowers and foliage used in floral design.</p> <p>9:9 List qualities to consider when selecting a deciduous plant for a landscape.</p> <p>10:5 Distinguish between acute and chronic toxicity.</p> <p>10:6 Define oral, dermal, and inhalation toxicity.</p> <p>10:7 List symptoms of pesticide poisoning.</p> <p>11:5 Describe the advantages of a soilless mixture.</p> <p>11:7 Compare plant growth in different media mixes.</p> <p>12:3 Describe soil texture.</p>
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	<p>12:11 Determine pH requirements of greenhouse and nursery plants.</p> <p>15:5 Place plants according to their lighting requirements.</p> <p>16:5 State signs that repotting is needed</p> <p>21:13 Plan a garden or border using varieties of annuals, biennials, and perennials,</p>
<p>B. Report data in an appropriate manner.</p>	<p>6:13 Create a line drawing of a design for an automatic watering system, label all parts, and prescribe system maintenance.</p> <p>7:11 Diagnose plant environmental problems and recommend solutions.</p> <p>7:12 Describe plant nutrients.</p> <p>7:13 Diagnose plant nutritional problems.</p> <p>12:2 List composition ratios of an average soil particle.</p> <p>12:3 Describe soil texture.</p>

	<p>12:5 Calculate soil type.</p> <p>14:6 Create zone and frost-date charts.</p>
<p>C. Predict data points not included on a given graph.</p>	<p>13:11 Use fertilizer label and ppm to calculate amount of dry fertilizer to be added to an injector system tank.</p> <p>14:5 Identify hardiness zones.</p> <p>14:6 Create zone and frost-date charts.</p> <p>14:7 Determine planting and shipping dates.</p>
<p>D. Interpret line, bar, and circle graphs.</p>	<p>13:11 Use fertilizer label and ppm to calculate amount of dry fertilizer to be added to an injector system tank.</p> <p>14:5 Identify hardiness zones.</p> <p>14:6 Create zone and frost-date charts.</p> <p>14:7 Determine planting and shipping dates.</p> <p>21:6 State general soil type and pH range for garden soils.</p>

	<p>21:7 Describe light exposure requirements and characteristics of ten species of annuals.</p> <p>21:8 Describe light exposure requirements and characteristics of two species of biennials.</p> <p>21:9 Describe light exposure requirements and characteristics of ten species of flowering perennials.</p> <p>21:10 Describe light exposure requirements and characteristics of five species of ground cover and vines.</p> <p>21:11 Describe light exposure, soil, and moisture requirements for three species of bulbs.</p>
<p>E. Identify data that support or reject stated hypothesis.</p>	<p>7:10 Describe cultural and environmental factors affecting plant growth.</p> <p>7:12 Describe plant nutrients.</p> <p>10:5 Distinguish between acute and chronic toxicity.</p> <p>10:6 Define oral, dermal, and inhalation toxicity.</p>

	<p>14:4 Describe factors that affect germination.</p> <p>14:8 Name methods of seeding.</p> <p>14:12 Define scarification techniques.</p> <p>14:13 Scarify seeds by file or sandpaper method.</p> <p>21:3 Match perennials with their correct propagation methods.</p> <p>21:6 State general soil type and pH range for garden soils.</p> <p>21:12 Select compatible varieties of flowers to be planted in full sun and partial shade.</p>
<p>F. Accept or reject hypothesis when given results of an investigation.</p>	<p>7:10 Describe cultural and environmental factors affecting plant growth.</p> <p>7:11 Diagnose plant environmental problems and recommend solutions.</p> <p>10:5 Distinguish between acute and chronic toxicity.</p>

	<p>10:6 Define oral, dermal, and inhalation toxicity.</p> <p>14:4 Describe factors that affect germination.</p> <p>14:8 Name methods of seeding.</p> <p>14:12 Define scarification techniques.</p> <p>14:13 Scarify seeds by file or sandpaper method.</p> <p>21:3 Match perennials with their correct propagation methods.</p> <p>21:6 State general soil type and pH range for garden soils.</p> <p>21:12 Select compatible varieties of flowers to be planted in full sun and partial shade.</p>
<p>G. Identify discrepancies between stated hypothesis and actual results.</p>	<p>7:10 Describe cultural and environmental factors affecting plant growth.</p> <p>7:11 Diagnose plant environmental problems and recommend solutions.</p>

	<p>10:5 Distinguish between acute and chronic toxicity.</p> <p>10:6 Define oral, dermal, and inhalation toxicity.</p> <p>14:4 Describe factors that affect germination.</p> <p>14:8 Name methods of seeding.</p> <p>14:12 Define scarification techniques.</p> <p>14:13 Scarify seeds by file or sandpaper method.</p> <p>21:3 Match perennials with their correct propagation methods.</p> <p>21:6 State general soil type and pH range for garden soils.</p> <p>21:12 Select compatible varieties of flowers to be planted in full sun and partial shade.</p>
<p>H. Select the most logical conclusion for given experimental data.</p>	<p>7:10 Describe cultural and environmental factors affecting plant growth.</p>

	<p>7:11 Diagnose plant environmental problems and recommend solutions.</p> <p>10:5 Distinguish between acute and chronic toxicity.</p> <p>10:6 Define oral, dermal, and inhalation toxicity.</p> <p>14:4 Describe factors that affect germination.</p> <p>14:8 Name methods of seeding.</p> <p>14:12 Define scarification techniques.</p> <p>14:13 Scarify seeds by file or sandpaper method.</p> <p>21:3 Match perennials with their correct propagation methods.</p> <p>21:6 State general soil type and pH range for garden soils.</p> <p>21:12 Select compatible varieties of flowers to be planted in full sun and partial shade.</p>
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PASS Skills Sub-Core: Biology

**PASS Content Standard Area V.
Communicating**

Content Skill Knowledge

Matching Curriculum Objectives

<p>A. Prepare a written report describing the sequence, results, and interpretation of an investigation or event.</p>	<p>9:11 Research deciduous plants.</p> <p>15:8 Research indoor plants.</p> <p>17:11 Research evergreens.</p>
<p>B. Communicate and defend a scientific argument.</p>	<p>6:4 Describe the correct watering method for propagating plants.</p> <p>6:14 List the advantages and disadvantages of hand watering.</p> <p>9:9 List qualities to consider when selecting a deciduous plant for a landscape.</p>

	<p>11:5 Describe the advantages of a soilless mixture.</p> <p>12:10 Recommend treatments for pH problems in soils.</p>
<p>C. Identify or create an appropriate graph or chart from collected data, table, or written description.</p>	<p>11:7 Compare plant growth in different media mixes.</p> <p>20:12 Plan a small vegetable garden.</p> <p>20.13 Plan a fruit garden.</p> <p>21:7 Describe light exposure requirements and characteristics of ten species of annuals.</p> <p>21:8 Describe light exposure requirements and characteristics of two species of biennials.</p> <p>21:9 Describe light exposure requirements and characteristics of ten species of flowering perennials.</p> <p>21:10 Describe light exposure requirements and characteristics of five species of ground cover and vines.</p>

	<p>21:11 Describe light exposure, soil, and moisture requirements for three species of bulbs.</p> <p>21:13 Plan a garden or border using varieties of annuals, biennials, and perennials.</p>
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PASS Skills Sub-Core: Biology

**PASS Content Standard Area VI.
Modeling**

Content Skill Knowledge

Matching Curriculum Objectives

<p>A. Select a model, which explains a given set of observations.</p>	<p>5:1 Match structural parts of a greenhouse to their descriptions.</p> <p>5:2 Match types of greenhouses to their descriptions and to their pictures.</p> <p>6:3 Match types of watering equipment to their descriptions.</p> <p>6:13 Create a line drawing of a design for an automatic watering system, label all parts, and prescribe system maintenance.</p> <p>7:1 Match the primary parts of a plant to their correct descriptions.</p>
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	<p>8:1 Match tools used in floral design to their correct uses.</p> <p>8:6 Select from a list guidelines for using color in floral design.</p> <p>8:12 Make a bud vase arrangement.</p> <p>10:14 Match types of spray equipment to their correct uses.</p> <p>10:15 Select from a list true statements about the information on a hazardous materials classification card.</p> <p>11:4 Match characteristics of materials used in mixing soil media to their correct descriptions.</p> <p>13:3 Match secondary elements necessary for growth and development to their descriptions.</p> <p>14:7 Determine planting and shipping dates.</p> <p>14:18 Propagate a leaf cutting.</p> <p>14:24 Propagate hardwood cuttings.</p>
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	<p>14:25 Bud by t-bud method.</p> <p>14:26 Bud by patch method.</p> <p>14:28 Graft by whip and tongue method.</p> <p>14:29 Graft by bark graft method.</p> <p>18:10 Ball and burlap a tree or shrub.</p> <p>18:11 Transplant balled-and-burlapped stock.</p> <p>18:12 Transplant a bare-root tree or shrub.</p> <p>18:13 Transplant container stock.</p> <p>18:14 Heel-in bare-root stock.</p> <p>19:7 Determine which parts of a tree to prune.</p>
<p>B. Select predictions based on models.</p>	<p>6:6 Select true statements about proper drainage and salt build-up.</p> <p>6:9 Determine the watering needs of plants</p>

	<p>9:9 List qualities to consider when selecting a deciduous plant for a landscape.</p> <p>11:2 Describe requirements for a good plant medium.</p> <p>13:2 Distinguish values of essential plant food elements nitrogen, phosphorus, and potassium.</p> <p>14:7 Determine planting and shipping dates.</p> <p>18:7 Determine ball size.</p> <p>19:7 Determine which parts of a tree to prune.</p> <p>20:7 Distinguish between advantages of raised bed planting methods and advantages of flat bed planting methods.</p> <p>20:8 Distinguish between advantages of direct seeding and advantages of transplanting.</p> <p>21:5 Select from a list considerations for planting a flower bed or border.</p>
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<p>C. Compare a given model to the real world.</p>	<p>5:1 Match structural parts of a greenhouse to their descriptions.</p> <p>5:2 Match types of greenhouses to their descriptions and to their pictures.</p> <p>4:12 Match electrical protection devices to their correct descriptions.</p> <p>6:3 Match types of watering equipment to their descriptions.</p> <p>6:13 Create a line drawing of a design for an automatic watering system, label all parts, and prescribe system maintenance.</p> <p>7:1 Match the primary parts of a plant to their correct descriptions.</p> <p>8:1 Match tools used in floral design to their correct uses.</p> <p>8:6 Select from a list guidelines for using color in floral design.</p> <p>10:14 Match types of spray equipment to their correct uses.</p>
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	<p>11:4 Match characteristics of materials used in mixing soil media to their correct descriptions.</p> <p>13:3 Match secondary elements necessary for growth and development to their descriptions.</p> <p>14:7 Determine planting and shipping dates.</p> <p>14:18 Propagate a leaf cutting.</p> <p>14:24 Propagate hardwood cuttings.</p> <p>14:25 Bud by t-bud method.</p> <p>14:26 Bud by patch method.</p> <p>14:28 Graft by whip and tongue method.</p> <p>14:29 Graft by bark graft method.</p> <p>18:10 Ball and burlap a tree or shrub.</p> <p>18:11 Transplant balled-and-burlapped stock.</p>
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	<p>18:12 Transplant a bare-root tree or shrub.</p> <p>18:13 Transplant container stock.</p> <p>19:7 Determine which parts of a tree to prune.</p>
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Oklahoma Career Tech Curriculum: Embedded PASS Skills

Horticulture: Science

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PASS Skills Sub-Core: Biology

PASS Content Standard Area VII. Safety in the Science Classroom

Content Skill Knowledge

Matching Curriculum Objectives

<p>A. Recognize potential hazards within a science activity.</p>	<p>3:1 State safety rules for using hand tools.</p> <p>3:7 Respond to scenarios involving hand-tool safety rules.</p> <p>3:8 State fuel safety practices for power equipment.</p> <p>3:10 State safety rules for operating power equipment.</p> <p>3:12 State safety rules for operating electric power tools.</p>
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	<p>3:15 State safety rules for specific pieces of equipment.</p> <p>4:1 State the major causes of accidents.</p> <p>4:2 State general job-safety rules.</p> <p>4:4 Describe the purpose of protective clothing.</p> <p>4:5 Complete statements about dress precautions.</p> <p>4:6 Distinguish among federal safety code colors.</p> <p>4:7 Name the type of fire extinguisher required to put out specific types of fires.</p> <p>4:9 Select from a list precautions to avoid a lightning strike.</p> <p>4:14 Complete safety rules for using tools.</p> <p>4:15 State safety rules for the work area.</p> <p>4:16 Analyze greenhouse safety.</p>
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	<p>10:8 State chemical safety precautions.</p> <p>10:10 Complete statements about the importance of protective clothing and equipment.</p>
<p>B. Practice safety procedures in all science activities.</p>	<p>3:6 Match correct use of the body with specific tools.</p> <p>3:9 Respond to scenarios involving fuel safety rules.</p> <p>3:11 Respond to scenarios involving power tool safety rules.</p> <p>3:13 Respond to scenarios involving safety rules for operating electric power</p> <p>3:16 Respond to scenarios involving safety rules for specific pieces of equipment.</p> <p>4:8 Operate a fire extinguisher.</p> <p>10:9 Complete statements about personal safety precautions for handling chemicals.</p>

	<p>10:13 Select from a list true statements concerning guidelines for hazardous waste disposal.</p> <p>10:17 Clean chemical containers for disposal.</p>
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PASS Skills Sub-Core: Biology

**PASS Content Standard Area VIII.
Inquiry**

Content Skill Knowledge

Matching Curriculum Objectives

<p>A. Formulate a testable hypothesis and design an appropriate experiment relating to the world.</p>	<p>6:9 Determine the watering needs of plants</p> <p>6:19 Determine watering frequency.</p> <p>7:11 Diagnose plant environmental problems and recommend solutions.</p> <p>7:13 Diagnose plant nutritional problems.</p> <p>11:7 Compare plant growth in different media mixes.</p>
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<p>B. Design and conduct scientific investigations in which variables are identified and controlled.</p>	<p>6:9 Determine the watering needs of plants</p> <p>6:19 Determine watering frequency.</p> <p>7:11 Diagnose plant environmental problems and recommend solutions.</p> <p>7:13 Diagnose plant nutritional problems.</p> <p>11:7 Compare plant growth in different media mixes.</p>
<p>C. Use a variety of technologies, such as hand tools, measuring instruments, and computers to collect, analyze, and display data.</p>	<p>6:10 Calculate the water quantity for bench plants using an automatic watering system.</p> <p>6:11 Calculate the amount of fertilizer for a proportioning pump in an automatic watering system and a hand-held hoon.</p> <p>6:18 Check moisture levels.</p> <p>6:19 Determine watering frequency.</p> <p>6:20 Check water temperature, water by hand, and leach soil.</p>

	<p>12:12 Test soil pH value with litmus paper.</p> <p>13:11 Use fertilizer label and ppm to calculate amount of dry fertilizer to be added to an injector system tank.</p> <p>18:7 Determine ball size.</p>
<p>D. Inquiries should lead to the formation of explanations or models (physical, conceptual, and mathematical). In answering questions, students should engage in discussions (based on scientific knowledge, the use of logic, and evidence from the investigations) and arguments that encourage the revision of their explanations, leading to further inquiry.</p>	<p>5:1 Match structural parts of a greenhouse to their descriptions.</p> <p>5:2 Match types of greenhouses to their descriptions and to their pictures.</p> <p>6:3 Match types of watering equipment to their descriptions.</p> <p>6:13 Create a line drawing of a design for an automatic watering system, label all parts, and prescribe system maintenance.</p> <p>7:1 Match the primary parts of a plant to their correct descriptions.</p> <p>8:1 Match tools used in floral design to their correct uses.</p> <p>8:6 Select from a list guidelines for using color in floral design.</p>

	<p>8:12 Make a bud vase arrangement.</p> <p>10:14 Match types of spray equipment to their correct uses.</p> <p>10:15 Select from a list true statements about the information on a hazardous materials classification card.</p> <p>11:4 Match characteristics of materials used in mixing soil media to their correct descriptions.</p> <p>13:3 Match secondary elements necessary for growth and development to their descriptions.</p> <p>14:7 Determine planting and shipping dates.</p> <p>14:18 Propagate a leaf cutting.</p> <p>14:24 Propagate hardwood cuttings.</p> <p>14:25 Bud by t-bud method.</p> <p>14:26 Bud by patch method.</p> <p>14:28 Graft by whip and tongue method.</p>
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	<p>14:29 Graft by bark graft method.</p> <p>18:10 Ball and burlap a tree or shrub.</p> <p>18:11 Transplant balled-and-burlapped stock.</p> <p>18:12 Transplant a bare-root tree or shrub.</p> <p>18:13 Transplant container stock.</p> <p>19:7 Determine which parts of a tree to prune.</p>
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PASS Skills Sub-Core: Biology

**PASS Content Standard Area IX.
The Cell**

Content Skill Knowledge	Matching Curriculum Objectives
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<p>A. Cells are the fundamental unit of life, comprised of a variety of structures that perform functions, such as transport information and synthesis of molecules.</p>	<p>**See supplement booklet to meet this PASS requirement.**</p>
<p>B. Cells function according to the information contained in DNA.</p>	<p>**See supplement booklet to meet this PASS requirement.**</p>
<p>C. Cells can differentiate and may develop into complex multi-cellular organisms.</p>	<p>**See supplement booklet to meet this PASS requirement.**</p>

Supplement Suggestions: Add a unit including genetic information, punnet square, introduction to DNA, inheritance, and hybrid plants (basic cell biology)

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**PASS Content Standard Area X.
The Molecular Basis of Heredity**

Content Skill Knowledge

Matching Curriculum Objectives

<p>A. In all organisms, the instructions for specifying the characteristics of the organism are carried in DNA, and changes in DNA (mutations) occur spontaneously at low rates.</p>	<p>**See supplement booklet to meet this PASS requirement.**</p>
<p>B. A sorting and recombination of genes in production results in a great variety of possible gene combinations from the offspring of any two parents.</p>	<p>**See supplement booklet to meet this PASS requirement.**</p>

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PASS Skills Sub-Core: Biology

**PASS Content Standard Area XI.
Biological Diversity**

Content Skill Knowledge	Matching Curriculum Objectives
<p>A. Different species might look dissimilar, but the unity among organisms becomes apparent from an analysis of internal structures, the similarity of their chemical processes, and the evidence of common ancestry.</p>	<p>7:1 Match the primary parts of a plant to their correct descriptions.</p> <p>7:3 Label parts of monocot and dicot vascular systems.</p> <p>7:5 Describe types of root systems.</p> <p>7:6 Match parts of a complete flower to their correct descriptions.</p> <p>7:8 Describe the process and formula for photosynthesis.</p> <p>7:9 Describe the process and formula for respiration.</p>

	<p>7:10 Describe cultural and environmental factors affecting plant growth.</p> <p>17:1 List features used to identify evergreens.</p>
<p>B. Diversity of species is developed through gradual processes over many generations. Species acquire many of their unique characteristics through biological adaptation, which involves the selection of naturally occurring variations in populations. Biological adaptations include changes in structures, behaviors, or physiology, that enhance survival and reproductive success in a particular environment.</p>	<p>7:8 Describe the process and formula for photosynthesis.</p> <p>7:9 Describe the process and formula for respiration.</p> <p>9:9 List qualities to consider when selecting a deciduous plant for a landscape.</p> <p>14:3 Arrange in order the steps in germination.</p> <p>14:4 Describe factors that affect germination.</p> <p>14:11 Define methods of speeding germination.</p> <p>17:10 Select true statements regarding narrow-leaved and broad-leaved evergreens.</p>

<p>C. Extinction occurs when the environment changes and the adaptive characteristics of a species are insufficient to its survival.</p>	<p>15:6 Select from a list characteristics of sick plants.</p> <p>15:7 Name common plant pests.</p>
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PASS Skills Sub-Core: Biology

**PASS Content Standard Area XII.
The Interdependence of Organisms**

Content Skill Knowledge

Matching Curriculum Objectives

<p>A. Matter on the earth cycles among the living and nonliving components of the biosphere.</p>	<p>7:8 Describe the process and formula for photosynthesis.</p> <p>7:9 Describe the process and formula for respiration.</p> <p>7:10 Describe cultural and environmental factors affecting plant growth.</p> <p>7:11 Diagnose plant environmental problems and recommend solutions.</p> <p>7:12 Describe plant nutrients.</p>
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<p>B. Energy flows through ecosystems in one direction.</p>	<p>7:11 Diagnose plant environmental problems and recommend solutions.</p> <p>7:12 Describe plant nutrients.</p> <p>7:13 Diagnose plant nutritional problems.</p>
<p>C. Organisms both cooperate and compete in ecosystems.</p>	<p>7:11 Diagnose plant environmental problems and recommend solutions.</p> <p>9:9 List qualities to consider when selecting a deciduous plant for a landscape.</p> <p>15:3 Explain environmental factors that affect indoor plant maintenance.</p> <p>17:8 Select from a list qualities to consider when selecting an evergreen for a landscape.</p>
<p>D. Living organisms have the capacity to produce populations of infinite size, but environments and resources limit population size.</p>	<p>12:6 Explain how soil particle size affects the movement of water through soil.</p> <p>13:3 Match secondary elements necessary for growth and development to their descriptions.</p>

	<p>13:4 Select from a list micronutrients required for plant growth and development.</p> <p>14:4 Describe factors that affect germination.</p> <p>14:15 Match factors affecting successful asexual propagation to their correct definitions.</p> <p>16:5 State signs that repotting is needed</p>
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**PASS Content Standard Area XIII.
Matter, Energy, and Organization in Living Systems**

Content Skill Knowledge

Matching Curriculum Objectives

<p>A. The complexity and organization of organisms accommodates the need for obtaining, transforming, transporting, releasing, and eliminating the matter and energy used to sustain the organism.</p>	<p>7:8 Describe the process and formula for photosynthesis.</p> <p>7:9 Describe the process and formula for respiration.</p> <p>7:10 Describe cultural and environmental factors affecting plant growth.</p> <p>7:11 Diagnose plant environmental problems and recommend solutions.</p> <p>7:12 Describe plant nutrients.</p>
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	<p>11:1 Select from a list true statements about the importance of pH values.</p> <p>11:2 Describe requirements for a good plant medium.</p> <p>11:4 Match characteristics of materials used in mixing soil media to their correct descriptions.</p>
<p>B. As matter and energy flow through different levels of organizations of living systems—cells , organs, organisms, and communities—and between living systems and the physical environment, chemical elements are recombined in different ways by different structures. Each recombination results in storage, use, and dissipation of energy into the environment as heat. Matter and energy are conserved in each change.</p>	<p>7:11 Diagnose plant environmental problems and recommend solutions.</p> <p>7:12 Describe plant nutrients.</p> <p>7:13 Diagnose plant nutritional problems.</p>

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**PASS Content Standard Area XIV.
The Behavior of Organisms**

Content Skill Knowledge

Matching Curriculum Objectives

<p>A. Organisms have behavioral responses to internal changes and to external stimuli.</p>	<p>11:7 Compare plant growth in different media mixes.</p> <p>13:2 Distinguish values of essential plant food elements nitrogen, phosphorus, and potassium.</p> <p>13:4 Select from a list micronutrients required for plant growth and development.</p> <p>14:1 Distinguish between reasons for using sexual or asexual propagation methods.</p>
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	<p>14:11 Define methods of speeding germination.</p> <p>14:12 Define scarification techniques.</p> <p>14:13 Scarify seeds by file or sandpaper method.</p> <p>14:14 Stratify seeds.</p> <p>14:15 Match factors affecting successful asexual propagation to their correct definitions.</p> <p>14:25 Bud by t-bud method.</p> <p>14:26 Bud by patch method.</p> <p>14:28 Graft by whip and tongue method.</p> <p>14:29 Graft by bark graft method.</p>
<p>B. Broad patterns of behavior exhibited by animals have adapted to ensure reproductive success.</p>	<p>7:10 Describe cultural and environmental factors affecting plant growth.</p> <p>7:11 Diagnose plant environmental problems and recommend solutions.</p>

HORTICULTURE

SCIENCE

CHEMISTRY

**Oklahoma Career Tech Curriculum:
Embedded PASS Skills**

Horticulture: Science

**CIMC Developed/
Recommended Curriculum:** Horticulture

**PASS Skills
Core Curriculum Area:** Science

PASS Skills Sub-Core: Chemistry

**PASS Content Standard Area I.
Observing and Measuring**

**Content Skill Knowledge
(common to all sub-cores)**

Matching Curriculum Objectives

<p>A. Identify similar or different characteristics in a given set of objects, organisms, or events.</p>	<p>4:7 Name the type of fire extinguisher required to put out specific types of fires.</p> <p>10:7 List symptoms of pesticide poisoning.</p> <p>13:1 Label components of complete fertilizer formula (Guaranteed analysis).</p>
<p>B. Select qualitative (descriptive) or quantitative (numerical) observations in a given set of objects, organisms, or events.</p>	<p>1:11 Calculate mix ratios.</p> <p>10:1 Select from a list true statements concerning pesticide classifications.</p>

	<p>10:5 Distinguish between acute and chronic toxicity.</p> <p>11:1 Select from a list true statements about the importance of pH values.</p> <p>12:8 State pH values for soil types.</p> <p>12:12 Test soil pH value with litmus paper.</p> <p>13:11 Use fertilizer label and ppm to calculate amount of dry fertilizer to be added to an injector system tank.</p>
<p>C. (5-00 Version) Identify qualitative (descriptive) or quantitative (numerical) observations in a given set of objects, organisms, or events.</p>	<p>6:10 Calculate the water quantity for bench plants using an automatic watering system.</p> <p>6:11 Calculate the amount of fertilizer for a proportioning pump in an automatic watering system and a hand-held hozon.</p> <p>13:11 Use fertilizer label and ppm to calculate amount of dry fertilizer to be added to an injector system tank.</p>
<p>D. Use the appropriate Systems International (SI) units (grams, meters, liters, and degrees Celsius) to measure objects, organisms, or events.</p>	<p>1:7 Match standard measures to their equivalents.</p> <p>1:8 Solve conversion problems.</p>

	<p>1:11 Calculate mix ratios.</p> <p>1:12 Solve problems for basic mix ratios.</p> <p>12:8 State pH values for soil types.</p> <p>13:11 Use fertilizer label and ppm to calculate amount of dry fertilizer to be added to an injector system tank.</p>
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**Oklahoma Career Tech Curriculum:
Embedded PASS Skills**

Horticulture: Science

**CIMC Developed/
Recommended Curriculum:** Horticulture

**PASS Skills
Core Curriculum Area:** Science

PASS Skills Sub-Core: Chemistry

**PASS Content Standard Area II.
Classifying**

**Content Skill Knowledge
(common to all sub-cores)** **Matching Curriculum Objectives**

A. Use observable properties to classify a set of objects, organisms, or events.	4:7 Name the type of fire extinguisher required to put out specific types of fires.
B. Identify the properties on which a given classification system is based.	13:10 Analyze information required on fertilizer bags.
C. Place an object, organism or event into a classification system.	10:2 Match common types of chemical controls used in horticulture to their correct descriptions.

Oklahoma Career Tech Curriculum: Embedded PASS Skills

Horticulture: Science

**CIMC Developed/
Recommended Curriculum:** Horticulture

**PASS Skills
Core Curriculum Area:** Science

PASS Skills Sub-Core: Chemistry

PASS Content Standard Area III. Experimenting

Content Skill Knowledge (common to all sub-cores)	Matching Curriculum Objectives
A. Arrange the steps of a scientific problem in logical order.	10:7 List symptoms of pesticide poisoning.
B. Identify the independent variables, dependent variables, and control in an experimental set-up.	**See supplemental booklet to meet this PASS requirement.**
C. Use mathematics to show relationships within a given set of observations.	**See supplemental booklet to meet this PASS requirement.**
D. Identify a hypothesis for a given problem.	**See supplemental booklet to meet this PASS requirement.**

**Oklahoma Career Tech Curriculum:
Embedded PASS Skills**

Horticulture: Science

**CIMC Developed/
Recommended Curriculum:** Horticulture

**PASS Skills
Core Curriculum Area:** Science

PASS Skills Sub-Core: Chemistry

**PASS Content Standard Area IV.
Interpreting**

**Content Skill Knowledge
(common to all sub-cores)**

Matching Curriculum Objectives

<p>A. Select appropriate predictions based on previously observed patterns of evidence.</p>	<p>10:5 Distinguish between acute and chronic toxicity.</p> <p>10:6 Define oral, dermal, and inhalation toxicity.</p> <p>10:7 List symptoms of pesticide poisoning.</p> <p>11:5 Describe the advantages of a soilless mixture.</p>
<p>B. Report data in an appropriate manner.</p>	<p>**See supplemental booklet to meet this PASS requirement.**</p>

<p>C. Predict data points not included on a given graph.</p>	<p>13:11 Use fertilizer label and ppm to calculate amount of dry fertilizer to be added to an injector system tank.</p>
<p>D. Interpret line, bar, and circle graphs.</p>	<p>13:11 Use fertilizer label and ppm to calculate amount of dry fertilizer to be added to an injector system tank.</p>
<p>E. Identify data that support or reject stated hypothesis.</p>	<p>10:5 Distinguish between acute and chronic toxicity.</p> <p>10:6 Define oral, dermal, and inhalation toxicity.</p>
<p>F. Accept or reject hypothesis when given results of an investigation.</p>	<p>10:5 Distinguish between acute and chronic toxicity.</p> <p>10:6 Define oral, dermal, and inhalation toxicity.</p>
<p>G. Identify discrepancies between stated hypothesis and actual results.</p>	<p>10:5 Distinguish between acute and chronic toxicity.</p> <p>10:6 Define oral, dermal, and inhalation toxicity.</p>
<p>H. Select the most logical conclusion for given experimental data.</p>	<p>10:5 Distinguish between acute and chronic toxicity.</p> <p>10:6 Define oral, dermal, and inhalation toxicity.</p>

Oklahoma Career Tech Curriculum: Embedded PASS Skills

Horticulture: Science

**CIMC Developed/
Recommended Curriculum:** Horticulture

**PASS Skills
Core Curriculum Area:** Science

PASS Skills Sub-Core: Chemistry

PASS Content Standard Area V. Communicating

Content Skill Knowledge (common to all sub-cores)	Matching Curriculum Objectives
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<p>A. Prepare a written report describing the sequence, results, and interpretation of an investigation or event.</p>	<p>**See supplemental booklet to meet this PASS requirement.**</p>
<p>B. Communicate and defend a scientific argument.</p>	<p>12:10 Recommend treatments for pH problems in soils.</p>
<p>C. Identify or create an appropriate graph or chart from collected data, table, or written description.</p>	<p>**See supplemental booklet to meet this PASS requirement.**</p>

Oklahoma Career Tech Curriculum: Embedded PASS Skills

Horticulture: Science

**CIMC Developed/
Recommended Curriculum:** Horticulture

**PASS Skills
Core Curriculum Area:** Science

PASS Skills Sub-Core: Chemistry

PASS Content Standard Area VI. Modeling

Content Skill Knowledge (common to all sub-cores)	Matching Curriculum Objectives
A. Select a model, which explains a given set of observations.	10:15 Select from a list true statements about the information on a hazardous materials classification card.
B. Select predictions based on models.	13:2 Distinguish values of essential plant food elements nitrogen, phosphorus, and potassium.
C. Compare a given model to the real world.	**See supplemental booklet to meet this PASS requirement.**

Oklahoma Career Tech Curriculum: Embedded PASS Skills

Horticulture: Science

**CIMC Developed/
Recommended Curriculum:** Horticulture

**PASS Skills
Core Curriculum Area:** Science

PASS Skills Sub-Core: Chemistry

PASS Content Standard Area VII. Safety in the Science Classroom

Content Skill Knowledge (common to all sub-cores)

Matching Curriculum Objectives

<p>A. Recognize potential hazards within a science activity.</p>	<p>3:1 State safety rules for using hand tools.</p> <p>3:7 Respond to scenarios involving hand-tool safety rules.</p> <p>3:8 State fuel safety practices for power equipment.</p> <p>3:10 State safety rules for operating power equipment.</p> <p>3:12 State safety rules for operating electric power tools.</p>
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	<p>3:15 State safety rules for specific pieces of equipment.</p> <p>4:1 State the major causes of accidents.</p> <p>4:2 State general job-safety rules.</p> <p>4:4 Describe the purpose of protective clothing.</p> <p>4:5 Complete statements about dress precautions.</p> <p>4:6 Distinguish among federal safety code colors.</p> <p>4:7 Name the type of fire extinguisher required to put out specific types of fires.</p> <p>4:9 Select from a list precautions to avoid a lightning strike.</p> <p>4:14 Complete safety rules for using tools.</p> <p>4:15 State safety rules for the work area.</p> <p>4:16 Analyze greenhouse safety.</p>
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	<p>10:8 State chemical safety precautions.</p> <p>10:10 Complete statements about the importance of protective clothing and equipment.</p>
<p>B. Practice safety procedures in all science activities.</p>	<p>3:6 Match correct use of the body with specific tools.</p> <p>3:9 Respond to scenarios involving fuel safety rules.</p> <p>3:11 Respond to scenarios involving power tool safety rules.</p> <p>3:13 Respond to scenarios involving safety rules for operating electric power</p> <p>3:16 Respond to scenarios involving safety rules for specific pieces of equipment.</p> <p>4:8 Operate a fire extinguisher.</p> <p>10:9 Complete statements about personal safety precautions for handling chemicals.</p>

	<p>10:13 Select from a list true statements concerning guidelines for hazardous waste disposal.</p> <p>10:17 Clean chemical containers for disposal.</p>
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**Oklahoma Career Tech Curriculum:
Embedded PASS Skills**

Horticulture: Science

CIMC Developed/

Recommended Curriculum: Horticulture

PASS Skills

Core Curriculum Area: Science

PASS Skills Sub-Core: Chemistry

PASS Content Standard Area VIII.

Inquiry

**Content Skill Knowledge
(common to all sub-cores)**

Matching Curriculum Objectives

<p>A. Formulate a testable hypothesis and design an appropriate experiment relating to the world.</p>	<p>**See supplemental booklet to meet this PASS requirement.**</p>
<p>B. Design and conduct scientific investigations in which variables are identified and controlled.</p>	<p>**See supplemental booklet to meet this PASS requirement.**</p>
<p>C. Use a variety of technologies, such as hand tools, measuring instruments, and computers to collect, analyze, and display data.</p>	<p>6:11 Calculate the amount of fertilizer for a proportioning pump in an automatic watering system and a hand-held hozon.</p> <p>12:12 Test soil pH value with litmus paper.</p> <p>13:11 Use fertilizer label and ppm to calculate amount of dry fertilizer to be added to an injector system tank.</p>

<p>D. Inquiries should lead to the formation of explanations or models (physical, conceptual, and mathematical). In answering questions, students should engage in discussions (based on scientific knowledge, the use of logic, and evidence from the investigations) and arguments that encourage the revision of their explanations, leading to further inquiry.</p>	<p>10:15 Select from a list true statements about the information on a hazardous materials classification card.</p>
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Oklahoma Career Tech Curriculum: Embedded PASS Skills

Horticulture: Science

**CIMC Developed/
Recommended Curriculum:** Horticulture

**PASS Skills
Core Curriculum Area:** Science

PASS Skills Sub-Core: Chemistry

PASS Content Standard Area IX. Structures and Properties of Matter

Content Skill Knowledge (unique to this sub-core)	Matching Curriculum Objectives
<p>A. Matter is made of atoms and atoms are composed of even smaller components.</p>	<p>**See supplemental booklet to meet this PASS requirement.**</p>
<p>B. Atoms interact with one another by transferring or sharing outer electrons that are farthest from the nucleus.</p>	<p>**See supplemental booklet to meet this PASS requirement.**</p>
<p>C. An element is composed of a single type of atom. When elements are listed in order according to the number of protons, repeating patterns of physical and chemical properties identify families of elements with similar properties. This is the basis for the Periodic Table.</p>	<p>**See supplemental booklet to meet this PASS requirement.**</p>

D. A compound is formed when two or more kinds of atoms bind together chemically. Each compound has unique chemical and physical properties.	**See supplemental booklet to meet this PASS requirement.**
E. Solids, liquids, and gases differ in the energy that binds them together.	**See supplemental booklet to meet this PASS requirement.**

Oklahoma Horticulture Curriculum: Embedded PASS Skills

Horticulture: Science

**CIMC Developed/
Recommended Curriculum:** Horticulture

**PASS Skills
Core Curriculum Area:** Science

PASS Skills Sub-Core: Chemistry

PASS Content Standard Area X. Chemical Reactions

Content Skill Knowledge (unique to this sub-core)

Matching Curriculum Objectives

A. Chemical reactions occur all around us. These reactions may release or consume energy but the total energy of the system remains constant.	**See supplemental booklet to meet this PASS requirement.**
B. A large number of important reactions involve the transfer of either electrons (oxidation/reduction) or hydrogen ions (acid/base reactions).	**See supplemental booklet to meet this PASS requirement.**
C. Reaction rates depend on the concentration and temperature of the reactants. Catalysts accelerate chemical reactions.	**See supplemental booklet to meet this PASS requirement.**

HORTICULTURE

SCIENCE

PHYSICS

**Oklahoma Career Tech Curriculum:
Embedded PASS Skills**

Horticulture: Science

**CIMC Developed/
Recommended Curriculum:** Horticulture

**PASS Skills
Core Curriculum Area:** Science

PASS Skills Sub-Core: Physics

**PASS Content Standard Area I.
Observing and Measuring**

Content Skill Knowledge (common to all sub-cores)	Matching Curriculum Objectives
<p>A. Identify similar or different characteristics in a given set of objects, organisms, or events.</p>	<p>**See supplemental booklet to meet this PASS requirement**</p>
<p>B. Select qualitative (descriptive) or quantitative (numerical) observations in a given set of objects, organisms, or events.</p>	<p>1:13 Calculate slope ratios.</p> <p>4:10 Distinguish between voltage applications.</p>
<p>C. Identify qualitative (descriptive) or quantitative (numerical) observations in a given set of objects, organisms, or events.</p>	<p>**See supplemental booklet to meet this PASS requirement**</p>

<p>D. Use the appropriate Systems International (SI) units (grams, meters, liters, and degrees Celsius) to measure objects, organisms, or events.</p>	<p>1:7 Match standard measures to their equivalents.</p> <p>1:8 Solve conversion problems.</p> <p>1:9 Write the basic formulas for surface area, area of a triangle, and volume.</p> <p>1:10 Solve problems using the formulas for area and volume.</p> <p>1:13 Calculate slope ratios.</p> <p>1:14 Solve problems for slope ratios.</p>
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**Oklahoma Career Tech Curriculum:
Embedded PASS Skills**

Horticulture: Science

**CIMC Developed/
Recommended Curriculum:** Horticulture

**PASS Skills
Core Curriculum Area:** Science

PASS Skills Sub-Core: Physics

**PASS Content Standard Area II.
Classifying**

Content Skill Knowledge (common to all sub-cores)	Matching Curriculum Objectives
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A. Use observable properties to classify a set of objects, organisms, or events.	**See supplemental booklet to meet this PASS requirement**
B. Identify the properties on which a given classification system is based.	**See supplemental booklet to meet this PASS requirement**
C. Place an object, organism or event into a classification system.	**See supplemental booklet to meet this PASS requirement**

**Oklahoma Career Tech Curriculum:
Embedded PASS Skills**

Horticulture: Science

**CIMC Developed/
Recommended Curriculum:** Horticulture

**PASS Skills
Core Curriculum Area:** Science

PASS Skills Sub-Core: Physics

**PASS Content Standard Area III.
Experimenting**

Content Skill Knowledge (common to all sub-cores)	Matching Curriculum Objectives
A. Arrange the steps of a scientific problem in logical order.	**See supplemental booklet to meet this PASS requirement**
B. Identify the independent variables, dependent variables, and control in an experimental set-up.	**See supplemental booklet to meet this PASS requirement**
C. Use mathematics to show relationships within a given set of observations.	**See supplemental booklet to meet this PASS requirement**
D. Identify a hypothesis for a given problem.	**See supplemental booklet to meet this PASS requirement**

Oklahoma Career Tech Curriculum: Embedded PASS Skills

Horticulture: Science

**CIMC Developed/
Recommended Curriculum:** Horticulture

**PASS Skills
Core Curriculum Area:** Science

PASS Skills Sub-Core: Physics

PASS Content Standard Area IV. Interpreting

Content Skill Knowledge (common to all sub-cores)	Matching Curriculum Objectives
A. Select appropriate predictions based on previously observed patterns of evidence.	**See supplemental booklet to meet this PASS requirement**
B. Report data in an appropriate manner.	**See supplemental booklet to meet this PASS requirement**
C. Predict data points not included on a given graph.	**See supplemental booklet to meet this PASS requirement**
D. Interpret line, bar, and circle graphs.	**See supplemental booklet to meet this PASS requirement**
E. Identify data that support or reject stated hypothesis.	**See supplemental booklet to meet this PASS requirement**

F. Accept or reject hypothesis when given results of an investigation.	**See supplemental booklet to meet this PASS requirement**
G. Identify discrepancies between stated hypothesis and actual results.	**See supplemental booklet to meet this PASS requirement**
H. Select the most logical conclusion for given experimental data.	**See supplemental booklet to meet this PASS requirement**

**Oklahoma Career Tech Curriculum:
Embedded PASS Skills**

Horticulture: Science

**CIMC Developed/
Recommended Curriculum:** Horticulture

**PASS Skills
Core Curriculum Area:** Science

PASS Skills Sub-Core: Physics

**PASS Content Standard Area V.
Communicating**

Content Skill Knowledge (common to all sub-cores)	Matching Curriculum Objectives
A. Prepare a written report describing the sequence, results, and interpretation of an investigation or event.	**See supplemental booklet to meet this PASS requirement**
B. Communicate and defend a scientific argument.	**See supplemental booklet to meet this PASS requirement**
C. Identify or create an appropriate graph or chart from collected data, table, or written description.	**See supplemental booklet to meet this PASS requirement**

**Oklahoma Career Tech Curriculum:
Embedded PASS Skills**

Horticulture: Science

**CIMC Developed/
Recommended Curriculum:** Horticulture

**PASS Skills
Core Curriculum Area:** Science

PASS Skills Sub-Core: Physics

**PASS Content Standard Area VI.
Modeling**

**Content Skill Knowledge
(common to all sub-cores)**

Matching Curriculum Objectives

<p>A. Select a model, which explains a given set of observations.</p>	<p>4:12 Match electrical protection devices to their correct descriptions.</p> <p>10:15 Select from a list true statements about the information on a hazardous materials classification card.</p>
<p>B. Select predictions based on models.</p>	<p>**See supplemental booklet to meet this PASS requirement**</p>
<p>C. Compare a given model to the real world.</p>	<p>4:12 Match electrical protection devices to their correct descriptions</p>

Oklahoma Career Tech Curriculum: Embedded PASS Skills

Horticulture: Science

**CIMC Developed/
Recommended Curriculum:** Horticulture

**PASS Skills
Core Curriculum Area:** Science

PASS Skills Sub-Core: Physics

PASS Content Standard Area VII. Safety in the Science Classroom

Content Skill Knowledge (common to all sub-cores)

Matching Curriculum Objectives

<p>A. Recognize potential hazards within a science activity.</p>	<p>3:1 State safety rules for using hand tools.</p> <p>3:7 Respond to scenarios involving hand-tool safety rules.</p> <p>3:8 State fuel safety practices for power equipment.</p> <p>3:10 State safety rules for operating power equipment.</p> <p>3:12 State safety rules for operating electric power tools.</p>
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	<p>3:15 State safety rules for specific pieces of equipment.</p> <p>4:1 State the major causes of accidents.</p> <p>4:2 State general job-safety rules.</p> <p>4:4 Describe the purpose of protective clothing.</p> <p>4:5 Complete statements about dress precautions.</p> <p>4:6 Distinguish among federal safety code colors.</p> <p>4:7 Name the type of fire extinguisher required to put out specific types of fires.</p> <p>4:9 Select from a list precautions to avoid a lightning strike.</p> <p>4:10 Distinguish between voltage applications.</p> <p>4:11 Complete electrical safety rules.</p> <p>4:14 Complete safety rules for using tools.</p>
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	<p>4:15 State safety rules for the work area.</p> <p>10:8 State chemical safety precautions.</p> <p>10:10 Complete statements about the importance of protective clothing and equipment.</p>
<p>B. Practice safety procedures in all science activities.</p>	<p>3:6 Match correct use of the body with specific tools.</p> <p>3:9 Respond to scenarios involving fuel safety rules.</p> <p>3:11 Respond to scenarios involving power tool safety rules.</p> <p>3:13 Respond to scenarios involving safety rules for operating electric power</p> <p>3:16 Respond to scenarios involving safety rules for specific pieces of equipment.</p> <p>4:8 Operate a fire extinguisher.</p> <p>4:12 Match electrical protection devices to their correct descriptions.</p>

	<p>4:13 Label three-wire receptacles.</p> <p>10:9 Complete statements about personal safety precautions for handling chemicals.</p> <p>10:13 Select from a list true statements concerning guidelines for hazardous waste disposal.</p> <p>10:17 Clean chemical containers for disposal.</p>
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**Oklahoma Career Tech Curriculum:
Embedded PASS Skills**

Horticulture: Science

**CIMC Developed/
Recommended Curriculum:** Horticulture
**PASS Skills
Core Curriculum Area:** Science
PASS Skills Sub-Core: Physics

**PASS Content Standard Area VIII.
Inquiry**

Content Skill Knowledge (common to all sub-cores)	Matching Curriculum Objectives
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<p>A. Formulate a testable hypothesis and design an appropriate experiment relating to the world.</p>	<p>**See supplemental booklet to meet this PASS requirement**</p>
<p>B. Design and conduct scientific investigations in which variables are identified and controlled.</p>	<p>**See supplemental booklet to meet this PASS requirement**</p>
<p>C. Use a variety of technologies, such as hand tools, measuring instruments, and computers to collect, analyze, and display data.</p>	<p>**See supplemental booklet to meet this PASS requirement**</p>

<p>D. Inquiries should lead to the formation of explanations or models (physical, conceptual, and mathematical). In answering questions, students should engage in discussions (based on scientific knowledge, the use of logic, and evidence from the investigations) and arguments that encourage the revision of their explanations, leading to further inquiry.</p>	<p>4:12 Match electrical protection devices to their correct descriptions</p> <p>10:15 Select from a list true statements about the information on a hazardous materials classification card.</p>
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**Oklahoma Career Tech Curriculum:
Embedded PASS Skills**

Horticulture: Science

**CIMC Developed/
Recommended Curriculum:** Horticulture

**PASS Skills
Core Curriculum Area:** Science

PASS Skills Sub-Core: Physics

**PASS Content Standard Area IX.
Motions and Forces**

Content Skill Knowledge (unique to this sub-core)	Matching Curriculum Objectives
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<p>A. Objects change their motion only when a net force is applied. Laws of motion are used to calculate precisely the effects of forces on the motion of objects.</p>	<p>**See supplemental booklet to meet this PASS requirement**</p>
<p>B. Gravitation is a universal force that each mass exerts on any other mass. The strength of the gravitational attractive force between two masses is proportional to the masses and inversely proportional to the square of the distance between them.</p>	<p>**See supplemental booklet to meet this PASS requirement**</p>
<p>C. The electric force is a universal force that exists between any two charged objects. The strength of the force is proportional to the charges and, as with gravitation, inversely proportional to the square of the distance between them.</p>	<p>**See supplemental booklet to meet this PASS requirement**</p>

<p>D. Electricity and magnetism are two aspects of a single electromagnetic force.</p>	<p>4:10 Distinguish between voltage applications.</p> <p>4:11 Complete electrical safety rules.</p> <p>4:12 Match electrical protection devices to their correct descriptions.</p>
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Oklahoma Horticulture Curriculum: Embedded PASS Skills

Horticulture: Science

**CIMC Developed/
Recommended Curriculum:** Horticulture

**PASS Skills
Core Curriculum Area:** Science

PASS Skills Sub-Core: Physics

PASS Content Standard Area X. Conservation of Energy

Content Skill Knowledge (unique to this sub-core)	Matching Curriculum Objectives
A. The total energy of the universe is constant. Energy can be transferred but never destroyed.	**See supplemental booklet to meet this PASS requirement**
B. All energy can be considered to be kinetic energy, potential energy, or energy contained by a field.	**See supplemental booklet to meet this PASS requirement**
C. Heat consists of random motion and the vibrations of atoms, molecules, and ions. The higher the temperature, the greater the atomic or molecular motion.	**See supplemental booklet to meet this PASS requirement**

Oklahoma Horticulture Curriculum: Embedded PASS Skills

Horticulture: Science

**CIMC Developed/
Recommended Curriculum:** Horticulture

**PASS Skills
Core Curriculum Area:** Science

PASS Skills Sub-Core: Physics

PASS Content Standard Area XI. Interactions of Energy and Matter

Content Skill Knowledge (unique to this sub-core)

Matching Curriculum Objectives

<p>A. Waves have energy and can transfer energy when they interact with matter.</p>	<p>**See supplemental booklet to meet this PASS requirement**</p>
<p>B. Electromagnetic waves result when a charged object is accelerated or decelerated.</p>	<p>**See supplemental booklet to meet this PASS requirement**</p>

HORTICULTURE

SCIENCE

SUMMARY

SUMMARY
PASS Skills in this particular analysis of
Career Tech Curriculum

Curriculum: Horticulture

PASS: Science—Physical Science

PASS Summary and Strengths

The core curriculum area met the majority of PASS standard requirements. Of the fourteen PASS content standards nine were addressed. Of the forty-four content skills within the PASS content standards twenty-four were addressed.

PASS Standards/Skills Not Addressed

AREA II—Classifying

C. Place an object, organism or event into a classification systems.

AREA III—Experimenting

A. Arrange the steps of a scientific problem in logical order.

B. Identify the independent variables, dependent variables, and control in an experimental set-up.

D. Identify a hypothesis for a given problem.

AREA V—Communicating

A. Prepare a written report describing the sequence, results, and interpretation of an investigation or event.

C. Identify or create an appropriate graph or chart from collected data, table, or written description.

AREA VIII—Inquiry

- A.** Formulate a testable hypothesis and design an appropriate experiment relating to the real world.
- B.** Design and conduct scientific investigations in which variables are identified and controlled.

AREA IX—Structure and Properties of Matter

- A.** Matter is made up of minute particles called atoms, and atoms are composed of even smaller components.
- B.** An element is composed of a single type of atom. When elements are listed in order according to the number of protons (called the atomic number), repeating patterns of physical and chemical properties identify families of elements with similar properties.
- C.** Matter has characteristic properties, such as boiling points, melting points, solubility, and density, which distinguish pure substances from another.

AREA X—Chemical Reactions

- B.** The rate of chemical reactions is affected by the concentration and temperature of the reacting material.

AREA XI—Motion and Forces

- A.** Objects change their motion only when a net force is applied. Laws of motion are used to determine the effects of forces on the motion of objects.
- B.** Gravitation is a universal force that each mass exerts on any other mass.

AREA XII—Interactions of Energy and Matter

- A.** All energy can be considered to be either kinetic energy, which is the energy of motion: potential energy, which depends on relative

- B.** Waves, including sounds and seismic waves, waves on water, and light waves, have energy and can transfer energy when they interact with matter.

AREA XIII—The Earth System

- A.** Geologic time can be estimated by observing rock sequences and using fossils to correlate the sequences at various locations.
- B.** The solid crust of the earth consists of separate plates that move very slowly pressing against one another in some places and pulling apart in other places.

AREA XIV—The Universe

- A.** The stars differ from each other in size, temperature, and age, but they appear to be made up of the same elements that are found on earth.
- B.** Stars condense by gravity out of clouds of molecules of the lightest elements until nuclear fusion of the light elements into heavier ones began to occur. Fusion released great amounts of energy over millions of years. Eventually, some stars exploded, producing clouds of heavy elements from which other stars and planets could later condense. The process of star formation and destruction continues.

SUMMARY
PASS Skills in this particular analysis of
Career Tech Curriculum

Curriculum: Horticulture

PASS: Science—Biology

PASS Summary and Strengths

The core curriculum area met the majority of PASS standard requirements. Of the fourteen PASS content standards twelve were addressed. Of the forty-seven content skills within the PASS content standards forty-two were addressed.

PASS Standards/Skills Not Addressed

AREA IX—The Cell

- A.** Cells are the fundamental unit of life, comprised of a variety of structures that perform functions, such as transport information and synthesis of molecules.
- B.** Cells function according to the information contained in DNA.
- C.** Cells can differentiate and may develop into complex multi-cellular organisms.

AREA X—The Molecular Basis of Heredity

- A.** In all organisms, the instructions for specifying the characteristics of the organism are carried in DNA, and changes in DNA (mutations) occur spontaneously at low rates.
- B.** A sorting and recombination of genes in production results in a great variety of possible gene combinations from the offspring of any two parents.

SUMMARY
PASS Skills in this particular analysis of
Career Tech Curriculum

Curriculum: Horticulture

PASS: Science—Chemistry

PASS Summary and Strengths

The core curriculum area met the majority of PASS standard requirements. Of the ten PASS content standards eight were addressed. Of the thirty-nine content skills within the PASS content standards twenty-two were addressed.

PASS Standards/Skills Not Addressed

AREA III—Experimenting

- B.** Identify the independent variables, dependent variables, and control in an experimental set-up
- C.** Use mathematics to show relationships within a given set of observations.
- D.** Identify a hypothesis for a given problem.

AREA IV—Interpreting

- B.** Report data in an appropriate manner

AREA V--Communicating

- A.** Prepare a written report describing the sequence, results, and interpretation of an investigation or event.
- C.** Identify or create an appropriate graph or chart from collected data, table, or written description

AREA VI—Modeling

- C. Compare a given model to the real world.

AREA VIII—Inquiry

- A. Formulate a testable hypothesis and design an appropriate experiment relating to the world
- B. Design and conduct scientific investigations in which variables are identified and controlled.

AREA IX—Structures and Properties of Matter

- A. Matter is made of atoms and atoms are composed of even smaller components
- B. Atoms interact with one another by transferring or sharing outer electrons that are farthest from the nucleus.
- C. An element is composed of a single type of atom. When elements are listed in order according to the number of protons, repeating patterns of physical and chemical properties identify families of elements with similar properties. This is the basis for the Periodic Table.
- D. A compound is formed when two or more kinds of atoms bind together chemically. Each compound has unique chemical and physical properties.
- E. Solids, liquids, and gases differ in the energy that binds them together.

AREA X—Chemical Reactions

- A. Chemical reactions occur all around us. These reactions may release or consume energy but the total energy of the system remains constant.
- B. A large number of important reactions involve the transfer of either electrons (oxidation/reduction) or hydrogen ions (acid/base reactions).

- C.** Reaction rates depend on the concentration and temperature of the reactants. Catalysts accelerate chemical reactions.

SUMMARY
PASS Skills in this particular analysis of
Career Tech Curriculum

Curriculum: Horticulture

PASS: Science—Physics

PASS Summary and Strengths

The core curriculum did not meet the majority of PASS standard requirements. Of the eleven PASS content standards five were addressed. Of the forty content skills within the PASS content standards eight were addressed.

PASS Standards/Skills Not Addressed

AREA I—Observing and Measuring

- A. Identify similar or different characteristics in a given set of objects, organisms, or events.
- C. Identify qualitative (descriptive) or quantitative (numerical) observations in a given set of objects, organisms, or events.

AREA II—Classifying

- A. Use observable properties to classify a set of objects, organisms, or events
- B. Identify the properties on which a given classification system is based.
- C. Place an object, organism or event into a classification system.

AREA III—Experimenting

- A. Arrange the steps of a scientific problem in logical order.

- B.** Identify the independent variables, dependent variables, and control in an experimental set-up.
- C.** Use mathematics to show relationships within a given set of observations.
- D.** Identify a hypothesis for a given problem.

AREA IV—Interpreting

- A.** Select appropriate predictions based on previously observed patterns of evidence.
- B.** Report data in an appropriate manner.
- C.** Predict data points not included on a given graph.
- D.** Interpret line, bar, and circle graphs.
- E.** Identify data that support or reject stated hypothesis.
- F.** Accept or reject hypothesis when given results of an investigation.
- G.** Identify discrepancies between stated hypothesis and actual results.
- H.** Select the most logical conclusion for given experimental data.

AREA V—Communicating

- A.** Prepare a written report describing the sequence, results, and interpretation of an investigation or event.
- B.** Communicate and defend a scientific argument.
- C.** Identify or create an appropriate graph or chart from collected data, table, or written description.

AREA VI—Modeling

- B.** Select predictions based on models.

AREA VIII—Inquiry

- A.** Formulate a testable hypothesis and design an appropriate experiment relating to the world.
- B.** Design and conduct scientific investigations in which variables are identified and controlled.
- C.** Use a variety of technologies, such as hand tools, measuring instruments, and computers to collect, analyze, and display data.

AREA IX—Motions and Forces

- A.** Objects change their motion only when a net force is applied. Laws of motion are used to calculate precisely the effects of forces on the motion of objects.
- B.** Gravitation is a universal force that each mass exerts on any other mass. The strength of the gravitational attractive force between two masses is proportional to the masses and inversely proportional to the square of the distance between them.
- C.** The electric force is a universal force that exists between any two charged objects. The strength of the force is proportional to the charges and, as with gravitation, inversely proportional to the square of the distance between them.

AREA X—Conservation of Energy

- A.** The total energy of the universe is constant. Energy can be transferred but never destroyed.
- B.** All energy can be considered to be kinetic energy, potential energy, or energy contained by a field.

- C. Heat consists of random motion and the vibrations of atoms, molecules, and ions. The higher the temperature, the greater the atomic or molecular motion.

AREA XI—Interactions of Energy and Matter

- A. Waves have energy and can transfer energy when they interact with matter.
- B. Electromagnetic waves result when a charged object is accelerated or decelerated.