

**Crosswalk Between: Wisconsin’s Model Academic Standards for Science and
Wisconsin’s Model Academic Standards for Agricultural Education
Physical, Earth, and Ag Science PEAS– Delavan-Darien High School, WI**

Instructions: Please fill out the third column illustrating how the proposed agriculture class meets the state standards in the first two columns. Information in the third column should include knowledge, concepts and skills, and a summary of the equivalent instructional time for the equivalent course. The first column lists Wisconsin’s Model Academic Standards for Science. Column two illustrates the various agriculture performance standards that have been crosswalked to the science performance standards in the first column.

A. SCIENCE CONNECTIONS	Agricultural Education Standards	Crosswalk of Local School Curriculum
Performance Standards	Performance Standards	
<i>By the end of Grade 12 students will:</i>	<i>By the end of Grade 12 students will:</i>	
A.12.1 Apply the underlying themes of science to develop defensible visions of the future	B.12.4 Access and use information for a class presentation about the impact of new technologies on the products manufactured and produced; e.g., biotechnology D.12.5 Describe how biotechnology can enhance food and fiber production D.12.6 Understand the impact emerging technologies within hydroponics, aquaculture, and biotechnology have on the food and fiber industries and natural resources E.12.3 Explain the impact of climate change on existing agricultural systems E.12.4 Analyze practices used by farmers to reduce erosion and runoff to maintain soil fertility and productivity E.12.5 Analyze the impact and use of chemicals in the production and processing of food and fiber E.12.6 Analyze benefits, costs, and consequences of processing food and fiber on the environment	
A.12.2 Show how conflicting assumptions about science themes lead to different opinions and decisions about evolution, health, population, longevity, education, and use of resources, and show how these opinions and decisions have diverse effects on an individual, a community, and a country, both now and in the future	D.12.3 Understand how public policy affects the food, fiber, and ornamental plant industries D.12.4 Explore traditional and nontraditional food, fiber, and ornamental horticultural jobs/careers and identify the necessary skills, aptitudes, and abilities E.12.2 Analyze benefits, costs, and consequences of land use E.12.3 Explain the impact of climate change on existing agricultural systems E.12.6 Analyze benefits, costs, and consequences of processing food and fiber on the environment	
A.12.3 Give examples that show how partial systems, models, and explanations are used to give quick and reasonable solutions that are accurate enough for basic needs	A.12.2 Understand the variety, complexity, and size of the agricultural industry in the world B.12.1 Apply knowledge of technology to identify and solve problems D.12.1 Describe the global utilization of Wisconsin’s food, fiber, and ornamental plant products	

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A.12.4 Construct arguments that show how conflicting models and explanations of events can start with similar evidence	E.12.3 Explain the impact of climate change on existing agricultural systems E.12.5 Analyze the impact and use of chemicals in the production and processing of food and fiber E.12.6 Analyze benefits, costs, and consequences of processing food and fiber on the environment	
A.12.5 Show how the ideas and themes of science can be used to make real-life decisions about careers, work places, life-styles, and use of resources	B.12.5 Explore various career opportunities in the food, fiber, and natural resources industries using available forms of technology D.12.4 Explore traditional and nontraditional food, fiber, and ornamental horticultural jobs/careers and identify the necessary skills, aptitudes, and abilities F.12.4 Research a career in agricultural business marketing and management	1. Identify and describe the major areas of plant and soil science occupations. 2. Identify career and entrepreneurship opportunities and expectations in plant and soil science.
A.12.6 Identify and replace inaccurate personal models and explanations of science-related phenomena using evidence learned or discovered	D.12.5 Describe how biotechnology can enhance food and fiber production E.12.5 Analyze the impact and use of chemicals in the production and processing of food and fiber E.12.6 Analyze benefits, costs, and consequences of processing food and fiber on the environment	
A.12.7 Re-examine the evidence and reasoning that led to conclusions drawn from investigations, using the science themes	E.12.1 Understand the application of agricultural technologies that can sustain production while reducing environmental impact E.12.4 Analyze practices used by farmers to reduce erosion and runoff to maintain soil fertility and productivity	
B. NATURE OF SCIENCE	Agricultural Education Standards	Crosswalk of Local School Curriculum
Performance Standards	Performance Standards	
<i>By the end of Grade 12 students will:</i>	<i>By the end of Grade 12 students will:</i>	
B.12.1 Show how cultures and individuals have contributed to the development of major ideas in the earth and space, life and environmental, and physical sciences	C.12.1 Demonstrate a working knowledge of leadership and leadership styles D.12.1 Describe the global utilization of Wisconsin’s food, fiber, and ornamental plant products D.12.3 Understand how public policy affects the food, fiber, and ornamental plant industries D.12.5 Describe how biotechnology can enhance food and fiber production	1. Explain how the science of agriculture helped develop civilization. 2. Identify and define the various areas of science and agriscience.

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	E.12.4 Analyze practices used by farmers to reduce erosion and runoff to maintain soil fertility and productivity	
B.12.2 Identify the cultural conditions that are usually present during great periods of discovery, scientific development, and invention	D.12.3 Understand how public policy affects the food, fiber, and ornamental plant industries D.12.5 Describe how biotechnology can enhance food and fiber production	
B.12.3 Relate the major themes of science to human progress in understanding science and the world	D.12.6 Understand the impact emerging technologies within hydroponics, aquaculture, and biotechnology have on the food and fiber industries and natural resources E.12.5 Analyze the impact and use of chemicals in the production and processing of food and fiber	1. Explain the early development of mechanical technology in agriculture.
B.12.4 Show how basic research and applied research contribute to new discoveries, inventions, and applications	B.12.4 Access and use information for a class presentation about the impact of new technologies on the products manufactured and produced; e.g., biotechnology D.12.5 Describe how biotechnology can enhance food and fiber production D.12.6 Understand the impact emerging technologies within hydroponics, aquaculture, and biotechnology have on the food and fiber industries and natural resources E.12.1 Understand the application of agricultural technologies that can sustain production while reducing environmental impact E.12.5 Analyze the impact and use of chemicals in the production and processing of food and fiber	1. Discuss advancements made through agriscience. 2. Explain the steps in conducting research in agriculture. 3. Discuss the general safety precautions that should be followed in conducting agricultural research. 4. Identify the different areas of agricultural mechanics involved in research. 5. Identify the important physical science areas in agricultural mechanics.
B.12.5 Explain how science is based on assumptions about the natural world and themes that describe the natural world	D.12.3 Understand how public policy affects the food, fiber, and ornamental plant industries E.12.3 Explain the impact of climate change on existing agricultural systems D.12.6 Understand the impact emerging technologies within hydroponics, aquaculture, and biotechnology have on the food and fiber industries and natural resources	
C. SCIENCE INQUIRY	Agricultural Education Standards	Crosswalk of Local School Curriculum
Performance Standards	Performance Standards	
<i>By the end of Grade 12 students will:</i>	<i>By the end of Grade 12 students will:</i>	
C.12.1 When studying science content, ask questions suggested by current social issues, scientific literature, and	B.12.1 Apply knowledge of technology to identify and solve problems	

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observations of phenomena; build hypotheses that might answer some of these questions; design possible investigations; and describe results that might emerge from such investigations	C.12.2 Practice skills relating to communication, problem-solving, and decision-making through individual, group, and team processes	
C.12.2 Identify issues from an area of science study, write questions that could be investigated, review previous research on these questions, and design and conduct responsible and safe investigations to help answer the questions	B.12.1 Apply knowledge of technology to identify and solve problems C.12.2 Practice skills relating to communication, problem-solving, and decision-making through individual, group, and team processes D.12.2 Discuss the impact that climate and water have on the food, fiber, and ornamental horticulture production cycles throughout the world D.12.6 Understand the impact emerging technologies within hydroponics, aquaculture, and biotechnology have on the food and fiber industries and natural resources E.12.4 Analyze practices used by farmers to reduce erosion and runoff to maintain soil fertility and productivity E.12.5 Analyze the impact and use of chemicals in the production and processing of food and fiber E.12.6 Analyze benefits, costs, and consequences of processing food and fiber on the environment	1. Explain the meaning of safety. 2. List hazards found in PSAA laboratories. 3. Identify and properly use personal protection equipment (PPE). 4. Describe safety practices with machinery and tools. 5. Describe safety in PSAA laboratories.
C.12.3 Evaluate the data collected during an investigation, critique the data-collection procedures and results, and suggest ways to make any needed improvements	B.12.1 Apply knowledge of technology to identify and solve problems B.12.3 Use technology to acquire, organize, and communicate information by entering, modifying, retrieving, and storing data C.12.2 Practice skills relating to communication, problem-solving, and decision-making	
C.12.4 During investigations, choose the best data-collection procedures and materials, use them competently, and calculate the degree of precision of the resulting data	B.12.1 Apply knowledge of technology to identify and solve problems B.12.3 Use technology to acquire, organize, and communicate information by entering, modifying, retrieving, and storing data C.12.2 Practice skills relating to communication, problem-solving, and decision-making	1. Explain the importance of tools and equipment in PSAA. 2. Identify common PSAA equipment. 3. Identify how to properly use a microscope. 4. Describe important activities in maintaining PSAA equipment.
C.12.5 Use the explanations and models found in earth and	B.12.2 Select and communicate information in an	

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space, life and environmental, and physical sciences to develop likely explanations for the results of their investigations	appropriate format; e.g., oral, written, graphic, pictorial, multimedia C.12.2 Practice skills relating to communication, problem-solving, and decision-making	
C.12.6 Present the results of investigations to groups concerned with the issues, explaining the meaning and implications of the results, and answering questions in terms the audience can understand	B.12.2 Select and communicate information in an appropriate format; e.g., oral, written, graphic, pictorial, multimedia B.12.4 Access and use information for a class presentation about the impact of new technologies on the products manufactured and produced; e.g., biotechnology C.12.2 Practice skills relating to communication, problem-solving, and decision-making	
C.12.7 Evaluate articles and reports in the popular press, in scientific journals, on television, and on the Internet, using criteria related to accuracy, degree of error, sampling, treatment of data, and other standards of experimental design	B.12.1 Apply knowledge of technology to identify and solve problems B.12.2 Select and communicate information in an appropriate format; e.g., oral, written, graphic, pictorial, multimedia C.12.2 Practice skills relating to communication, problem-solving, and decision-making	1. Identify the major parts of a research report. 2. Explain the general guidelines for preparing a research report. 3. Explain how to properly include tables and figures in a research report.
D. PHYSICAL SCIENCE	Agricultural Education Standards	Crosswalk of Local School Curriculum
Performance Standards	Performance Standards	
<i>By the end of Grade 12 students will:</i>	<i>By the end of Grade 12 students will:</i>	
Structures of Atoms and Matter		
D.12.1 Describe atomic structure and the properties of atoms, molecules, and matter during physical and chemical interactions	D.12.5 Describe how biotechnology can enhance food and fiber production D.12.6 Understand the impact emerging technologies within hydroponics, aquaculture, and biotechnology have on the food and fiber industries and natural resources E.12.4 Analyze practices used by farmers to reduce erosion and runoff to maintain soil fertility and productivity E.12.5 Analyze the impact and use of chemicals in the production and processing of food and fiber E.12.6 Analyze benefits, costs, and consequences of processing food and fiber on the environment	1. Explain the physical changes that occur in a liquid when it begins to boil. 2. Explain the effects of atmospheric pressure on boiling point. 3. Describe how the boiling point of a liquid can be manipulated.
D.12.2 Explain the forces that hold the atom together and illustrate how nuclear interactions change the atom	No significant match found	

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D.12.3 Explain exchanges of energy in chemical interactions and exchange of mass and energy in atomic/nuclear reactions	E.12.3 Explain the impact of climate change on existing agricultural systems E.12.5 Analyze the impact and use of chemicals in the production and processing of food and fiber E.12.6 Analyze benefits, costs, and consequences of processing food and fiber on the environment	
Chemical Reactions		
D.12.4 Explain how substances, both simple and complex, interact with one another to produce new substances	D.12.5 Describe how biotechnology can enhance food and fiber production D.12.6 Understand the impact emerging technologies within hydroponics, aquaculture, and biotechnology have on the food and fiber industries and natural resources E.12.5 Analyze the impact and use of chemicals in the production and processing of food and fiber E.12.6 Analyze benefits, costs, and consequences of processing food and fiber on the environment	<ol style="list-style-type: none"> 1. Describe the composition of milk. 2. Explain the processing of raw milk and the pasteurization process. 3. List and describe bacterial succession in milk and explain the process of milk spoilage. 4. Describe bacteria which can be present in milk. 5. Describe procedures for maintaining the quality of milk by reducing the rate of souring. 6. Describe the composition of yogurt. 7. Explain how fermentation and anaerobic respiration are needed to create the yogurt product. 8. Explain the effects of microorganisms in the cheese-making process. 9. Explain how/why milk curdles and describe the conditions at which milk will curdle. 10. Describe what happens to cheese during the ripening process. 11. Describe the physical changes that occur in the ice cream mixture during freezing. 12. Explain the effects of sugar, salt, or similar molecules on the freezing of liquids. 13. Describe the ingredients and factors that give ice cream its characteristic smooth and creamy texture.
D.12.5 Identify patterns in chemical and physical properties and use them to predict likely chemical and physical changes and interactions	D.12.5 Describe how biotechnology can enhance food and fiber production D.12.6 Understand the impact emerging technologies within hydroponics, aquaculture, and biotechnology have on the food and fiber industries and natural resources E.12.5 Analyze the impact and use of chemicals in the	<ol style="list-style-type: none"> 1. Define fertile soil. 2. Identify the essential nutrients for plant growth. 3. Distinguish between micronutrients and macronutrients. 4. Explain how nutrients are exchanged in the soil. 5. Collect soil for testing.

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	production and processing of food and fiber	<ol style="list-style-type: none"> 1. Conduct a soil test. 2. Define pH and discuss its role in plant nutrition. 3. Explain how soils become acidic. 4. Explain how soil pH is measured. 5. Explain why lime is applied to acid soils. 6. Discuss the effectiveness of lime on acidic soils. 7. Explain factors that determine how rapidly milk begins to sour.
D.12.6 Through investigations, identify the types of chemical interactions, including endothermic, exothermic, oxidation, photosynthesis, and acid/base reactions	<p>D.12.5 Describe how biotechnology can enhance food and fiber production</p> <p>E.12.4 Analyze practices used by farmers to reduce erosion and runoff to maintain soil fertility and productivity</p> <p>E.12.5 Analyze the impact and use of chemicals in the production and processing of food and fiber</p> <p>E.12.6 Analyze benefits, costs, and consequences of processing food and fiber on the environment</p>	
Motions and Forces		
D.12.7 Qualitatively and quantitatively analyze changes in the motion of objects and the forces that act on them and represent analytical data both algebraically and graphically	No significant match found	<ol style="list-style-type: none"> 1. Quantify the relationship between slope and velocity. 2. Describe the impact of roughness (friction) on velocity. 3. Make design decisions relative to slope and roughness to control water velocities insurface drains.
D.12.8 Understand the forces of gravitation, the electromagnetic force, and the intermolecular force, and explain their impact on the universal system	No significant match found	
D.12.9 Describe models of light, heat, and sound and through investigations describe similarities and differences in the way these energy forms behave	<p>D.12.5 Describe how biotechnology can enhance food and fiber production</p> <p>D.12.6 Understand the impact emerging technologies within hydroponics, aquaculture, and biotechnology have on the food and fiber industries and natural resources</p> <p>E.12.6 Analyze benefits, costs, and consequences of processing food and fiber on the environment</p>	
Conservation of Energy and the Increase in Disorder		

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D.12.10 Using the science themes, illustrate the law of conservation of energy during chemical and nuclear reactions	No significant match found	
Interactions of Matter and Energy		
D.12.11 Using the science themes, explain common occurrences in the physical world	D.12.2 Discuss the impact that climate and water have on the food, fiber, and ornamental horticulture production cycles throughout the world D.12.5 Describe how biotechnology can enhance food and fiber production D.12.6 Understand the impact emerging technologies within hydroponics, aquaculture, and biotechnology have on the food and fiber industries and natural resources E.12.3 Explain the impact of climate change on existing agricultural systems E.12.5 Analyze the impact and use of chemicals in the production and processing of food and fiber E.12.6 Analyze benefits, costs, and consequences of processing food and fiber on the environment	
D.12.12 Using the science themes and knowledge of chemical, physical, atomic and nuclear interactions, explain changes in materials, living things, the earth's features, and stars	D.12.5 Describe how biotechnology can enhance food and fiber production D.12.6 Understand the impact emerging technologies within hydroponics, aquaculture, and biotechnology have on the food and fiber industries and natural resources E.12.3 Explain the impact of climate change on existing agricultural systems E.12.5 Analyze the impact and use of chemicals in the production and processing of food and fiber	
E. EARTH AND SPACE SCIENCE	Agricultural Education Standards	Crosswalk of Local School Curriculum
Performance Standards	Performance Standards	
<i>By the end of Grade 12 students will:</i>	<i>By the end of Grade 12 students will::</i>	
Energy in the Earth System		
E.12.1 Using the science themes, distinguish between internal energies (decay of radioactive isotopes, gravity) and external energies (sun) in the earth's systems and show how these sources of energy have an impact on those systems	D.12.2 Discuss the impact that climate and water have on the food, fiber, and ornamental horticulture production cycles throughout the world. E 12.3 Explain the impact of climate change on existing agricultural systems	

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Geochemical Cycles		
<p>E.12.2 Analyze the geochemical and physical cycles of the earth and use them to describe movements of matter</p>	<p>D.12.2 Discuss the impact that climate and water have on the food, fiber, and ornamental horticulture production cycles throughout the world E 12.3 Explain the impact of climate change on existing agricultural systems</p>	<ol style="list-style-type: none"> 1. Explain how the resources soil provides help in supporting life. 2. Explain the contents of soil. 3. Describe the biological nature of soil. 4. Describe the four ways plants use soil. 5. Describe some agricultural uses of soil. 6. Describe some nonagricultural uses of soil. 7. Identify five factors involved in soil formation. 8. Describe different types of parent material. 9. Explain topography and how it affects soil formation. 10. Assess the impact of organisms on soil development. 11. Describe how time and weathering affect properties of soil. 12. Examine how climate affects the development of soil. 13. Differentiate soils based on physical features. 14. Recognize colors used to describe surface soils. 15. Analyze factors that determine surface soil colors. 16. Identify colors used to describe subsoil. 17. Explain factors that determine subsoil colors. 18. Explain how parent material, age, and slope affect soil color. 19. Describe the concept of soil texture and its importance. 20. Determine the texture of a soil sample. 21. Explain soil structure, its formation, and importance. 22. Differentiate various soil structures. 23. Explain the soil profile. 24. Explain how soils within the profile change over time. 25. Distinguish between the major horizons of a soil profile. 26. Describe moisture-holding capacity. 27. Explain what determines a soil’s moisture-holding capacity. 28. Determine the moisture-holding capacity of a given soil profile.

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		<p>29. Define soil degradation. 30. Explain how construction can result in soil degradation. 31. Identify sources of contamination, and explain how they result in soil degradation. 32. Explain soil erosion and how it results in soil degradation. 33. Identify other sources of soil degradation. 34. Explain soil erosion. 35. Identify the causes of soil erosion and steps in the erosion process. 36. Examine ways in which different types of wind erosion occur and the associated problems. 37. Distinguish between the different types of water erosion. 38. Evaluate urban management practices that reduce soil erosion. 39. Assess horticultural management practices that will minimize soil erosion. 40. Describe the concept of soil texture and its importance. 41. Identify the classes of soil separates. 42. Use a soil textural triangle to identify fine, medium, and coarse textured soils. 43. Identify the texture of a sample of soil. 44. Explain why it is difficult to change the soil texture. 45. Describe the concept and importance of soil density. 46. Determine soil density. 47. Explain how to alter soil density. 48. Describe the effect of soil density on erosion, water holding capacity and flooding. 49. Define water holding capacity and gravitational water. 50. Explain how water holding capacity and permeability is affected by soil type. 51. Define permeability. 52. Describe the effects of soil type on permeability. 53. Evaluate the drainability of soils.</p>
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		<p>54. Define the forces that act on soil water. 55. Discuss how water moves through the soil. 56. Measure the flow of water through different soil textures. 57. Define infiltration, application rate, and wetted pattern. 58. Describe the relationships between soil texture, infiltration rates, and wetted pattern. 59. Analyze a specific site for inputs into design and management of a microirrigation system.</p>
The Origin and Evolution of the Earth System		
E.12.3: Using the science themes, describe theories of the origins and evolution of the universe and solar system, including the earth system as a part of the solar system, and relate these theories and their implications to geologic time on earth	<p>E.12.2 Analyze benefits, costs, and consequences of land use E.12.3 Explain the impact of climate change on existing agricultural systems. E.12.4 Analyze practices used by farmers to reduce erosion and runoff to maintain soil fertility and productivity</p>	
E.12.4 Analyze the benefits, costs, and limitations of past, present, and projected use of resources and technology and explain the consequences to the environment	<p>B.12.4 Access and use information for a class presentation about the impact of new technologies on the products manufactured and produced; e.g., biotechnology D.12.5 Describe how biotechnology can enhance food and fiber production. D.12.6 Understand the impact emerging technologies within hydroponics, aquaculture, and biotechnology have on the food and fiber industries and natural resources. E.12.1 Understand the application of agricultural technologies that can sustain production while reducing environmental impact. E.12.2 Analyze benefits, costs, and consequences of land use E.12.4 Analyze practices used by farmers to reduce erosion and runoff to maintain soil fertility and productivity E.12.5 Analyze the impact and use of chemicals in the</p>	<p>1. Identify the environmental impacts of soil erosion. 2. Identify the economic impacts of soil erosion. 3. Define land capability and ways to improve it. 4. Identify factors that determine land capability. 5. Explain the land capability classification system. 6. Describe the soil erosion process. 7. Identify the various types of soil erosion. 8. Estimate the amount of soil loss from water erosion. 9. Discuss how to control soil erosion.</p>

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	production and processing of food and fiber E.12.6 Analyze benefits, costs, and consequences of processing food and fiber on the environment.	
The Origin and Evolution of the Universe		
E.12.5 Using the science themes, understand that the origin of the universe is not completely understood, but that there are current ideas in science that attempt to explain its origin	No significant match	
F. LIFE AND ENVIRONMENTAL SCIENCE	Agricultural Education Standards	Crosswalk of Local School Curriculum
Performance Standards	Performance Standards	
<i>By the end of Grade 12 students will:</i>	<i>By the end of Grade 12 students will:</i>	
The Cell		
F.12.1 Evaluate the normal structures and the general and special functions of cells in single-celled and multiple-celled organisms	B.12.4 Access and use information for a class presentation about the impact of new technologies on the products manufactured and produced; e.g., biotechnology D.12.5 Describe how biotechnology can enhance food and fiber production. D.12.6 Understand the impact emerging technologies within hydroponics, aquaculture, and biotechnology have on the food and fiber industries and natural resources. E.12.1 Understand the application of agricultural technolgies that can sustain production while reducing environmental impact.	
F.12.2 Understand how cells differentiate and how cells are regulated	D.12.5 Describe how biotechnology can enhance food and fiber production. E.12.1 Understand the application of agricultural technolgies that can sustain production while reducing environmental impact	
The Molecular Basis of Heredity		
F.12.3 Explain current scientific ideas and information about the molecular and genetic basis of heredity	D.12.5 Describe how biotechnology can enhance food and fiber production D.12.6 Understand the impact emerging technologies within hydroponics, aquaculture, and biotechnology have on the food and fiber industries and natural resources. E.12.1 Understand the application of agricultural technolgies that can sustain production while reducing environmental impact	
F.12.4 State the relationships between functions of the cell	D.12.5 Describe how biotechnology can enhance food and	

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and functions of the organism as related to genetics and heredity	<p>fiber production.</p> <p>D.12.6 Understand the impact emerging technologies within hydroponics, aquaculture, and biotechnology have on the food and fiber industries and natural resources.</p> <p>E.12.1 Understand the application of agricultural technologies that can sustain production while reducing environmental impact</p>	
Biological Evolution		
F.12.5 Understand the theory of evolution, natural selection, and biological classification	<p>D.12.5 Describe how biotechnology can enhance food and fiber production.</p> <p>D.12.6 Understand the impact emerging technologies within hydroponics, aquaculture, and biotechnology have on the food and fiber industries and natural resources.</p>	
F.12.6 Using concepts of evolution and heredity, account for changes in species and the diversity of species, including the influence of these changes on science, e.g., breeding of plants or animals	<p>D.12.5 Describe how biotechnology can enhance food and fiber production</p> <p>D.12.6 Understand the impact emerging technologies within hydroponics, aquaculture, and biotechnology have on the food and fiber industries and natural resources</p> <p>E.12.1 Understand the application of agricultural technologies that can sustain production while reducing environmental impact</p>	
The Interdependence of Organisms		
F.12.7 Investigate how organisms both cooperate and compete in ecosystems	<p>E.12.1 Understand the application of agricultural technologies that can sustain production while reducing environmental impact</p> <p>E.12.2 Analyze benefits, costs, and consequences of land use</p> <p>E.12.6 Analyze benefits, costs, and consequences of processing food and fiber on the environment</p>	

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<p>F.12.8 Using the science themes, infer changes in ecosystems prompted by the introduction of new species, environmental conditions, chemicals, and air, water, or earth pollution</p>	<p>D.12.2 Discuss the impact that climate and water have on the food, fiber, and ornamental horticulture production cycles throughout the world D.12.5 Describe how biotechnology can enhance food and fiber production D.12.6 Understand the impact emerging technologies within hydroponics, aquaculture, and biotechnology have on the food and fiber industries and natural resources. E.12.1 Understand the application of agricultural technologies that can sustain production while reducing environmental impact E.12.2 Analyze benefits, costs, and consequences of land use E.12.3 Explain the impact of climate change on existing agricultural systems E.12.4 Analyze practices used by farmers to reduce erosion and runoff to maintain soil fertility and productivity E.12.5 Analyze the impact and use of chemicals in the production and processing of food and fiber E.12.6 Analyze benefits, costs, and consequences of processing food and fiber on the environment</p>	
<p>Matter, Energy, and Organization in Living Systems</p>		
<p>F.12.9 Using the science themes, investigate energy systems (related to food chains) to show how energy is stored in food (plants and animals) and how energy is released by digestion and metabolism</p>	<p>D.12.1 Describe the global utilization of Wisconsin’s food, fiber, and ornamental plant products E.12.3 Explain the impact of climate change on existing agricultural systems</p>	<ol style="list-style-type: none"> 1. Explain why proper nutrition is important for all organisms. 2. List the six essential nutrients needed by organisms and explain their overall importance. 3. Explain the importance of water in the body. 4. Explain how minerals are important to organisms. 5. Explain the importance of vitamins to organisms. 6. Explain the importance of protein for organisms. 7. Explain why carbohydrates are essential to the survival of organisms. 8. Explain the importance of lipids. 9. Describe the importance of vitamins in the diet. 10. Explain how vitamins function in the body. 11. Explain the effects of having deficient or excess

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		amounts of Vitamin C in the body.
F.12.10 Understand the impact of energy on organisms in living systems	No significant match found	
F.12.11 Investigate how the complexity and organization of organisms accommodates the need for obtaining, transforming, transporting, releasing, and eliminating the matter and energy used to sustain an organism	D.12.1 Describe the global utilization of Wisconsin’s food, fiber, and ornamental plant products D.12.2 Discuss the impact that climate and water have on the food, fiber, and ornamental horticulture production cycles throughout the world D.12.5 Describe how biotechnology can enhance food and fiber production. E.12.3 Explain the impact of climate change on existing agricultural systems	
The Behavior of Organisms		
F.12.12 Trace how the sensory and nervous systems of various organisms react to the internal and external environment and transmit survival or learning stimuli to cause changes in behavior or responses	D.12.2 Discuss the impact that climate and water have on the food, fiber, and ornamental horticulture production cycles throughout the world D.12.5 Describe how biotechnology can enhance food and fiber production E.12.3 Explain the impact of climate change on existing agricultural systems	
G. SCIENCE APPLICATIONS	Agricultural Education Standards	Crosswalk of Local School Curriculum
Performance Standards	Performance Standards	
<i>By the end of Grade 12 students will:</i>	<i>By the end of Grade 12 students will:</i>	
G.12.1 Identify personal interests in science and technology; account for implications that these interests might have for future education, and options to be considered	D.12.4 Explore traditional and nontraditional food, fiber, and ornamental horticultural jobs/careers and identify the necessary skills, aptitudes, and abilities B.12.5 Explore various career opportunities in the food, fiber, and natural resources industries using available forms of technology B.12.6 Access information identifying the postsecondary education programs, both in and outside of Wisconsin, leading to careers in the food, fiber, and natural F.12.4 Research a career in agricultural business marketing and management	
G.12.2 Design, build, evaluate, and revise models and explanations related to the earth and space, life and	D.12.2 Discuss the impact that climate and water have on the food, fiber, and ornamental horticulture production	

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environmental, and physical sciences	cycles throughout the world E.12.3 Explain the impact of climate change on existing agricultural systems E.12.4 Analyze practices used by farmers to reduce soil erosion and runoff to maintain soil fertility and productivity	
G.12.3 Analyze the costs, benefits, or problems resulting from a scientific or technological innovation, including implications for the individual and the community	A.12.2 Understand the variety, complexity, and size of the agricultural industry in the world A.12.3 Describe how global interdependence benefits the production and distribution of food and fiber B.12.1 Apply knowledge of technology to identify and solve problems B.12.4 Access and use information for a class presentation about the impact of new technologies on the products manufactured and produced; e.g., biotechnology D.12.5 Describe how biotechnology can enhance food and fiber production D.12.6 Understand the impact emerging technologies within hydroponics, aquaculture, and biotechnology have on the food and fiber industries and natural resources E.12.1 Understand the application of agricultural technologies that can sustain production while reducing environmental impact E.12.2 Analyze benefits, costs, and consequences of land use E.12.4 Analyze practices used by farmers to reduce erosion and runoff to maintain soil fertility and productivity E.12.5 Analyze the impact and use of chemicals in the production and processing of food and fiber E.12.6 Analyze benefits, costs, and consequences of processing food and fiber on the environment	
G.12.4 Show how a major scientific or technological change has had an impact on work, leisure, or the home	B.12.4 Access and use information for a class presentation about the impact of new technologies on the products manufactured and produced; e.g., biotechnology D.12.6 Understand the impact emerging technologies within hydroponics, aquaculture, and biotechnology have	

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	on the food and fiber industries and natural resources	
G.12.5 Choose a specific problem in our society, identify alternative scientific or technological solutions to that problem and argue its merits	B.12.1 Apply knowledge of technology to identify and solve problems	
H. SCIENCE IN SOCIAL AND PERSONAL PERSPECTIVES	Agricultural Education Standards	Crosswalk of Local School Curriculum
Performance Standards	Performance Standards	
<i>By the end of Grade 12 students will:</i>	<i>By the end of Grade 12 students will.:</i>	
H.12.1 Using the science themes and knowledge of the earth and space, life and environmental, and physical sciences, analyze the costs, risks, benefits, and consequences of a proposal concerning resource management in the community and determine the potential impact of the proposal on life in the community and the region	A.12.1 Identify how political policies and issues shape and influence food and fiber systems A.12.3 Describe how global interdependence benefits the production and distribution of food and fiber D.12.3 Understand how public policy affects the food, fiber, and ornamental plant industries cite examples of conflicts between environmentalists and producers of food and fiber E.12.1 Understand the application of agricultural technologies that can sustain production while reducing environmental impact E.12.2 Analyze benefits, costs, and consequences of land use E.12.3 Explain the impact of climate change on existing agricultural systems E.12.4 Analyze practices used by farmers to reduce erosion and runoff to maintain soil fertility and productivity E.12.5 Analyze the impact and use of chemicals in the production and processing of food and fiber E.12.6 Analyze benefits, costs, and consequences of processing food and fiber on the environment	
H.12.2 Evaluate proposed policy recommendations (local, state, and/or national) in science and technology for validity, evidence, reasoning, and implications, both short and long term	A.12.1 Identify how political policies and issues shape and influence food and fiber Systems B.12.1 Apply knowledge of technology to identify and solve problems C.12.2 Practice skills relating to communication, problem-solving, and decision-making through individual, group,	

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	<p>and team processes D.12.3 Understand how public policy affects the food, fiber, and ornamental plant industries E.12.2 Analyze benefits, costs, and consequences of land use F.12.1 Describe how the production, distribution, and marketing of food and fiber is part of a complex economic system</p>	
H.12.3 Show how policy decisions in science depend on many factors, including social values, ethics, beliefs, and time-frames, and considerations of science and technology	<p>A.12.1 Identify how political policies and issues shape and influence food and fiber systems B.12.1 Apply knowledge of technology to identify and solve problems D.12.3 Understand how public policy affects the food, fiber, and ornamental plant industries E.12.2 Analyze benefits, costs, and consequences of land use E.12.6 Analyze benefits, costs, and consequences of processing food and fiber on the environment F.12.1 Describe how the production, distribution, and marketing of food and fiber is part of a complex economic system</p>	
H.12.4 Advocate a solution or combination of solutions to a problem in science or technology	<p>B.12.1 Apply knowledge of technology to identify and solve problems D.12.3 Understand how public policy affects the food, fiber, and ornamental plant industries D.12.5 Describe how biotechnology can enhance food and fiber production D.12.6 Understand the impact emerging technologies within hydroponics, aquaculture, and biotechnology have on the food and fiber industries and natural resources</p>	
H.12.5 Investigate how current plans or proposals concerning resource management, scientific knowledge, or technological development will have an impact on the environment, ecology, and quality of life in a community or region	<p>A.12.1 Identify how political policies and issues shape and influence food and fiber systems A.12.3 Describe how global interdependence benefits the production and distribution of food and fiber B.12.1 Apply knowledge of technology to identify and solve problems D.12.3 Understand how public policy affects the food,</p>	

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	<p>fiber, and ornamental plant industries D.12.6 Understand the impact emerging technologies within hydroponics, aquaculture, and biotechnology have on the food and fiber industries and natural resources E.12.2 Analyze benefits, costs, and consequences of land use E 12.4 Analyze practices used by farmers to reduce erosion and runoff to maintain soil fertility and productivity</p>	
H.12.6 Evaluate data and sources of information when using scientific information to make decisions.	<p>B.12.3 Use technology to acquire, organize, and communicate information by entering, modifying, retrieving, and storing data B.12.4 Access and use information for a class presentation about the impact of new technologies on the products manufactured and produced; e.g., biotechnology D.12.3 Understand how public policy affects the food, fiber, and ornamental plant industries</p>	<p>1. Understand the importance of the scientific method. 2. Explain the steps in conducting research in agriculture. 3. Explain the importance of controlled research.</p>
H.12.7 When making decisions, construct a plan that includes the use of current scientific knowledge and scientific reasoning.	<p>B.12.3 Use technology to acquire, organize, and communicate information by entering, modifying, retrieving, and storing data D.12.3 Understand how public policy affects the food, fiber, and ornamental plant industries</p>	

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