Auburn School District #408

Course: Biology: Plant Science	**Total Framework Hours:** 180
CIP Code: 030101	**Type:** Exploratory
Career Cluster: AFNR **Cluster Pathway:** Plant Systems	**Date Last Modified: 04/25/2015**

Unit 1 - SAE	**Hours: 5**

Performance Assessments:

1.1 Each student will develop, implement and monitor their progress throughout the year on an SAE project of their choosing.

1.2 Produce journal entries using agricultural experience tracker (AET) or a hard and keep an accurate record of learning, time, income and expenses.

Leadership Alignment:

FFA related extended learning opportunities include SAE, 21st Century Skills used: Thinking creatively, work creatively with others, reason effectively, and making judgments and decisions, communicating clearly, collaborate with others, solve problems, manage projects and adapt to change.

Career Development Event: 21st Century Skills: Use and manage information, access and evaluate information, crate media products, apply technology, work effectively in diverse teams, interact effectively with others, manage goals and time, guide and lead others, be responsible to others, produce results, be flexible and work independently.
FFA Award Applications: 21st Century Skills: Work independently and be self directed learners.

Standards and Competencies

Students will be able to:

1.1 SAE.01.01.a. Explain the history of SAE.
1.2 SAE.01.01.b. Explain the benefits of SAE projects to skill development, leadership and career success.
1.3 SAE.01.01.c. Explain the connection between SAE and FFA.
1.4 SAE.01.01.d. Explain the five types of SAE. (Entrepreneurship, Placement, Research, Exploratory, Improvement)
1.5 SAE.01.01.e. Explore ideas for SAE projects
1.6 SAE.01.01.f. Explain how SAE projects support academic achievement.
1.7 SAE.01.01.g. Select and establish an SAE project.
1.8 SAE.01.01.h. Explain and keep records on established SAE projects.
1.9 SAE.01.01.i. Explain SAE project Supervision, visitation and assessment.
1.10 SAE.01.01.j. Explain how SAE projects benefit the community.
1.11 SAE.01.01.k. Seek recognition for SAE project accomplishments.
1.12 SAE.01.01.l. Explain the three circle concept for SAE, FFA Leadership, and Classroom/Laboratory in an Agriculture Education program.
Pathway content standards: Students will demonstrate competence in the application of scientifie principles and techniques to biotechnology in agriculture: BS.02. Performance Element: Demonstrate laboratory skills as applied to biotechnology: BS.02.01.01.b. Analyze strengths of the research based on data and procedures, and propose future investigation. **BS.02.01.01.c.** Utilize external reviews and compare them to research conducted.

Aligned Washington State Standards

Language

CC: College and Career Readiness Anchor Standards for Language

Conventions of Standard English

1 - Demonstrate command of the conventions of standard English grammar and usage when writing or speaking.

2 - Demonstrate command of the conventions of standard English capitalization, punctuation, and spelling when writing. Knowledge of

Language

3 - Apply knowledge of language to understand how language functions in different contexts, to make effective choices for meaning or style, and to comprehend more fully when reading or listening.

Vocabulary Acquisition and Use

4 - Determine or clarify the meaning of unknown and multiple-meaning words and phrases by using context clues, analyzing meaningful parts, and consulting general and specialized reference materials, as appropriate.

5 - Demonstrate understanding of word relationships and nuances in word meanings.

6 - Acquire and use accurately a range of general academic and domain-specific words and phrases sufficient for reading, writing, speaking,

and listening at the college and career readiness level; demonstrate independence in gathering vocabulary knowledge when considering a word or phrase important to comprehension or expression.

Writing

CC: College and Career Readiness Anchor Standards for Writing Text Types and Purposes
1 - Write arguments to support claims in an analysis of substantive topics or texts, using valid reasoning and relevant and sufficient evidence.
2 - Write informative/explanatory texts to examine and convey complex ideas and information clearly and accurately through the effective selection, organization, and analysis of content.
3 - Write narratives to develop real or imagined experiences or events using effective technique, well-chosen details, and well-structured event sequences.

Production and Distribution of Writing.

4 - Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.
5 - Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach.
6 - Use technology, including the Internet, to produce and publish writing and to interact and collaborate with others.

Research to Build and Present Knowledge

8 - Gather relevant information from multiple print and digital sources, assess the credibility and accuracy of each source, and integrate the information while avoiding plagiarism.
9 - Draw evidence from literary or informational texts to support analysis, reflection, and research.

Range of Writing

10 -Write routinely over extended time frames (time for research, reflection, and revision) and shorter time frames (a single sitting or a day or two) for a range of tasks, purposes, and audiences.

21st Century Skills

Check those that students will demonstrate in this course:

LEARNING & INNOVATION

Creativity and Innovation
x Think Creatively
X Work Creatively with Others
□ Implement Innovations

Critical Thinking and Problem Solving
x Reason Effectively
x Use Systems Thinking
x Make Judgments and Decisions
x Solve Problems

Communication and Collaboration
x Communicate Clearly

INFORMATION, MEDIA & TECHNOLOGY SKILLS

Information Literacy
x Access and /evaluate Information
x Use and Manage Information

Media Literacy
□ Analyze Media
x Create Media Products

Information, Communications and Technology (ICT Literacy)
x Apply Technology Effectively

LIFE & CAREER SKILLS

Flexibility and Adaptability
x Adapt to Change
x Be Flexible

Initiative and Self-Direction
x Manage Goals and Time
x Work Independently
□ Be Self-Directed Learners

Social and Cross-Cultural
x Interact Effectively with Others
x Work Effectively in Diverse Teams

Productivity and Accountability

x Collaborate with Others		x Manage Projects x Produce Results **Leadership and Responsibility** x Guide and Lead Others x Be Responsible to Others

Unit 2 - Macromolecules	Hours: 8

Performance Assessments:

2.1 Lab/lab report: Enzymes
2.2 Formal written assessment

Leadership Alignment:

Students will make judgments and decisions, communicate clearly, access and /evaluate Information and use technology while writing their enzyme reports.
Students will use a presentation board to display an enzyme project with a focus on systems alignment. 21st Century Skills: Use systems thinking, make judgments and decisions, communicate clearly, access and /evaluate Information, use and manage information, collaborate with others, while developing their presentation board, which will also be presented in class for the communicate clearly portion of the 21st century skills.

Prepared public speaking in class or at a science fair. 21st Century Skills: think creatively, manage goals and time, work independently, interact effectively with others, manage projects, produce results, be responsible to others, solve problems, adapt to change, be flexible

Standards and Competencies

Students will be able to:
2.1 Name the types of macromolecules

2.2 Explain how cells break down food molecules and use the constituents to synthesize proteins, sugars, fats, DNA and many other molecules that cells require.
2.3 Describe the role that enzymes play in the breakdown of food molecules and synthesis of the many different molecules needed for cell structure and function.
2.4 Explain how cells extract and store energy from food molecules.
Pathway content standards: Students will demonstrate competence in the application of scientific principles and techniques to biotechnology in agriculture: BS.03.02.02.b. Compare and contrast bioengineering and conventional pathways used in food processing. **BS.03.02.02.a.** Identify foods produced through fermentation**. BS.03.01.02.a.** Describe enzymes, the changes they cause in foods and the physical and chemical parameters that affect enzymatic reactions. **BS.02.05.04.a.** Perform simple enzyme activity assays to detect proteins.
BS.02.05.04.b. Perform protein separation techniques and interpret the results.
BS.02.05.04.c. Characterize the biochemical properties of proteins.
BS.02.05.05.a. Describe how antibodies are formed and how they can be used in biotechnology applications.
2.5 **BS.02.05.05.**

Aligned Washington State Standards

Communication - Speaking and Listening
CC: College and Career Readiness Anchor Standards for Speaking and Listening 2 -Integrate and evaluate information presented in diverse media and formats, including visually, quantitatively, and orally.
Language

CC: College and Career Readiness Anchor Standards for Language

Vocabulary Acquisition and Use

4- Determine or clarify the meaning of unknown and multiple-meaning words and phrases by using context clues, analyzing meaningful word Parts, and consulting general and specialized reference materials, as appropriate.

Mathematics

CC: Mathematical Practices (MP)

1 - Make sense of problems and persevere in solving them.

2 - Reason abstractly and quantitatively.

Reading

CC: Reading for Literacy in Science and Technical Subjects

Key Ideas and Details (9-10)

2 - Determine the central ideas or conclusions of a text; trace the text's explanation or depiction of a complex process, phenomenon, or concept; provide an accurate summary of the text.

Craft and Structure (9-10)

3- Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 9–10 texts and topics.

Science

LS1F All of the functions of the cell is based on chemical reactions. Food molecules are broken down to provide the energy and the chemical constituents needed to synthesize other molecules. Breakdown and synthesis are made possible by proteins called enzymes. Some of these enzymes enable the cell to store energy in special chemicals, such as ATP, that are needed to drive the many other chemical reactions in a cell.

Writing

CC: College and Career Readiness Anchor Standards for Writing

Text Types and Purposes

2 - Write informative/explanatory texts to examine and convey complex ideas and information clearly and accurately through the effective selection, organization, and analysis of content.

3- Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.

10-Write routinely over extended time frames (time for research, reflection, and revision) and shorter time frames (a single sitting or a day or two) for a range of tasks, purposes, and audiences.

21st Century Skills

Check those that students will demonstrate in this course:

LEARNING & INNOVATION	INFORMATION, MEDIA & TECHNOLOGY SKILLS	LIFE & CAREER SKILLS
Creativity and Innovation x Think Creatively X Work Creatively with Others □ Implement Innovations **Critical Thinking and Problem Solving** x Reason Effectively x Use Systems Thinking x Make Judgments and Decisions x Solve Problems **Communication and Collaboration** x Communicate Clearly x Collaborate with Others	**Information Literacy** x Access and /evaluate Information x Use and Manage Information **Media Literacy** □ Analyze Media □ Create Media Products **Information, Communications and Technology (ICT Literacy)** x Apply Technology Effectively	**Flexibility and Adaptability** x Adapt to Change x Be Flexible **Initiative and Self-Direction** x Manage Goals and Time x Work Independently □ Be Self-Directed Learners **Social and Cross-Cultural** x Interact Effectively with Others x Work Effectively in Diverse Teams **Productivity and Accountability** x Manage Projects x Produce Results **Leadership and Responsibility** □ Guide and Lead Others x Be Responsible to Others

Unit 3 - Cell Structure and Function	Hours: 16

Performance Assessments:

3.1 Lab: Plant verses Animal Cells and identify primary parts
3.2 Model: Plant/Animal Cells, Explain the function of each part
3.3 Formal written assessment

Leadership Alignment:

Students will create access and /evaluate information, adapt to change, manage goals and time, work independently, be flexible, use and manage information, interact effectively with others, manage projects, produce results, guide and lead others and be responsible to others while they create a model of plant and animal cells to present at a local science fair or County fair, FFA related extended learning opportunities include Local and State Fair events such as cell poster, models and virus safety poster projects.

Standards and Competencies

Students will be able to:
3.1 Describe the characteristics of living things
3.2 Describe the three components of cell theory
3.2 Identify and describe the difference between a Prokaryote and Eukaryote
3.3 Identify primary cell parts – Cell Wall, Cell Membrane, Nucleus and Cytoplasm.
3.4 Explain the function of each organelle in both plant and animal cell
3.5 Compare plant and animal cells and diagram their parts.
3.6 Project/ Make a model of plant cells

Pathway content standards: Students will demonstrate competence in the application of scientific principles and techniques to biotechnology in agriculture: BS.03. Performance Element: Demonstrate the application of biotechnology to Agriculture, Food and Natural Resources (AFNR).

BS.03.01.01.a. Explain biological, social, agronomic and economic reasons for genetic modification of eukaryotes.

BS.03.01.01.b. Diagram the processes and describe the techniques used to produce transgenic eukaryotes.

BS.03.01.01.c. Design and conduct an experiment to evaluate an existing transgenic eukaryote.

Aligned Washington State Standards

Communication - Speaking and Listening

CC: College and Career Readiness Anchor Standards for Speaking and Listening
2- Integrate and evaluate information presented in diverse media and formats, including visually, quantitatively, and orally.
3- Present information, findings, and supporting evidence such that listeners can follow the line of reasoning and the organization,

development, and style are appropriate to task, purpose, and audience.

Language

CC: College and Career Readiness Anchor Standards for Language

Vocabulary Acquisition and Use

4- Determine or clarify the meaning of unknown and multiple-meaning words and phrases by using context clues, analyzing meaningful word parts, and consulting general and specialized reference materials, as appropriate.

Mathematics

CC: Mathematical Practices (MP)

1 - Make sense of problems and persevere in solving them.

2 - Reason abstractly and quantitatively.

Reading

CC: Reading for Literacy in Science and Technical Subjects

Key Ideas and Details (9-10)

2 - Determine the central ideas or conclusions of a text; trace the text's explanation or depiction of a complex process, phenomenon, or concept; provide an accurate summary of the text.

Craft and Structure (9-10)

3- Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 9–10 texts and topics.

Science

LS1C Cells contain specialized parts for determining essential functions such as regulation of cellular activities, energy capture and release, formation of proteins, waste disposal, the transfer of information, and movement.

LS1D The cell is surrounded by a membrane that separates the interior of the cell from the outside world and determines which substances may enter and which may leave the cell.

Writing

CC: College and Career Readiness Anchor Standards for Writing

Text Types and Purposes

2 - Write informative/explanatory texts to examine and convey complex ideas and information clearly and accurately through the effective selection, organization, and analysis of content.

4 - Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.

10- Write routinely over extended time frames (time for research, reflection, and revision) and shorter time frames (a single sitting or a day or two) for a range of tasks, purposes, and audiences.

21st Century Skills
Check those that students will demonstrate in this course:

LEARNING & INNOVATION **Creativity and Innovation** x Think Creatively X Work Creatively with Others □ Implement Innovations **Critical Thinking and Problem Solving** x Reason Effectively x Use Systems Thinking x Make Judgments and Decisions x Solve Problems **Communication and Collaboration** x Communicate Clearly x Collaborate with Others	**INFORMATION, MEDIA & TECHNOLOGY SKILLS** **Information Literacy** x Access and /evaluate Information x Use and Manage Information **Media Literacy** □ Analyze Media x Create Media Products **Information, Communications and Technology (ICT Literacy)** x Apply Technology Effectively	**LIFE & CAREER SKILLS** **Flexibility and Adaptability** x Adapt to Change x Be Flexible **Initiative and Self-Direction** x Manage Goals and Time x Work Independently □ Be Self-Directed Learners **Social and Cross-Cultural** x Interact Effectively with Others x Work Effectively in Diverse Teams **Productivity and Accountability** x Manage Projects x Produce Results **Leadership and Responsibility** x Guide and Lead Others x Be Responsible to Others

Unit 4 - Scientific Process/Inquiry	**Hours: 13**

Performance Assessments:
4.1 Given a Hypothesis students must write lab procedures to state standard. 4.2 Given procedures and data, students must write a lab conclusion to state standard. 4.3 Given lab procedures, data and conclusion, students must develop a new method to test the hypothesis.
Leadership Alignment:

The above performance assessments will embed instruction and assessment of extended learning opportunities like an SAE: 21st Century Skills: Students will think creatively, work creatively with others, reason effectively, use systems thinking**,** access and /evaluate Information, use and manage information, collaborate with others, analyze media, be flexible, manage goals and time while designing and performing an experiment that includes the formal lab report containing conclusion, data, hypothesis and a new method to test the hypotheses for their class or SAE projects.

Standards and Competencies

Students will be able to:

4.1 Write a hypothesis based on a question (Prediction and Predicted Reason)
4.2 Write lab procedures that address a hypothesis and answer a question (Materials, 2 Controlled Variables, 1 Manipulated Variables, 1 Responding Variable, Record Data, Repeat Trials, Logical Steps, Extra Validity, and Experimental Control when applicable).
4.3 Write conclusions based on lab data (Strong Conclusive Statement, High Data, Low Data, Explanatory Language, Connecting Language, Scientific Reason).
4.4 Participate in a scientific discussion.
4.5 Plan and guide an experiment

BS.02.04. Performance Indicator: Safely manage biological materials, chemicals and wastes used in the laboratory. **BS.02.04.01.a.** Prepare simple chemical solutions using standard operating procedures.
BS.02.04.01.b. Prepare buffers, reagents, solutions and media.
BS.02.04.01.c. Verify the physical properties of buffers, reagents, solutions and media.
4.6
BS.02.04.02.a. Identify and describe hazards associated with biological and chemical materials.
BS.02.04.02.b. Inventory biological and chemical materials, and maintain accurate records of supplies and expiration dates.
BS.02.04.02.c. Order, stock and maintain supplies of

biological and chemical materials.
BS.02.04.03.a. Maintain a safe environment by properly identifying and disposing of laboratory waste.
4.7 **BS.02.04.03.b.** Diagram

Aligned Washington State Standards

Communication - Speaking and Listening

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Language

CC: College and Career Readiness Anchor Standards for Language

Vocabulary Acquisition and Use

4- Determine or clarify the meaning of unknown and multiple-meaning words and phrases by using context clues, analyzing meaningful word parts, and consulting general and specialized reference materials, as appropriate.

Mathematics

CC: Mathematical Practices (MP)
1 - Make sense of problems and persevere in solving them.
2 - Reason abstractly and quantitatively.

Reading

CC: Reading for Literacy in Science and Technical Subjects

Key Ideas and Details (9-10)

2 - Determine the central ideas or conclusions of a text; trace the text's explanation or depiction of a complex process, phenomenon, or concept; provide an accurate summary of the text.

Craft and Structure (9-10)

3- Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 9–10 texts and topics.

Science
INQA Question-Scientists generate and evaluate questions to investigate the natural world. INQB Investigate-Scientific progress requires the use of various methods appropriate for answering different kinds of research questions, a thoughtful plan for gathering data needed to answer the question, and care in collecting, analyzing, and displaying the data. INQC Explain-Conclusions must be logical, based on evidence, and consistent with prior established knowledge. INQD Communicate-Clearly the methods and procedures that scientists use to obtain evidence must be clearly reported to enhance opportunities for further investigation. INQE Model-The essence of scientific investigation involves the development of a theory or conceptual model that can generate testable predictions. INQF Communicate-Science is a human endeavor that involves logical reasoning and creativity and entails the testing, revision, and occasional discarding of theories as new evidence comes to light. INQG Intellectual-Honesty Public communication among scientists is an essential aspect of research. Scientists evaluate the validity of one another's investigations, check the reliability of results, and explain inconsistencies in findings. INQH Intellectual-Honesty Scientists carefully evaluate sources of information for reliability before using that information. When referring to the ideas or findings of others, they cite their sources of information.
Writing
CC: College and Career Readiness Anchor Standards for Writing **Text Types and Purposes** 1 - Write arguments to support claims in an analysis of substantive topics or texts, using valid reasoning and relevant and sufficient evidence. 2 - Write informative/explanatory texts to examine and convey complex ideas and information clearly and accurately through the effective Selection, organization, and analysis of content. 4 - Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience. 5 - Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach. 10- Write routinely over extended time frames (time for research, reflection, and revision) and shorter time frames (a single sitting or a day or two) for a range of tasks, purposes, and audiences.
21st Century Skills
Check those that students will demonstrate in this course:

LEARNING & INNOVATION	INFORMATION, MEDIA & TECHNOLOGY SKILLS	LIFE & CAREER SKILLS
Creativity and Innovation x Think Creatively X Work Creatively with Others □ Implement Innovations **Critical Thinking and Problem Solving** x Reason Effectively x Use Systems Thinking	**Information Literacy** x Access and /evaluate Information x Use and Manage Information **Media Literacy** x Analyze Media x Create Media Products	**Flexibility and Adaptability** x Adapt to Change x Be Flexible **Initiative and Self-Direction** x Manage Goals and Time x Work Independently □ Be Self-Directed Learners

x Make Judgments and Decisions x Solve Problems **Communication and Collaboration** x Communicate Clearly x Collaborate with Others	**Information, Communications and Technology (ICT Literacy)** x Apply Technology Effectively	**Social and Cross-Cultural** x Interact Effectively with Others □ Work Effectively in Diverse Teams **Productivity and Accountability** x Manage Projects x Produce Results **Leadership and Responsibility** □ Guide and Lead Others x Be Responsible to Others

Unit 5 - Cell Boundaries – Osmosis/Diffusion	Hours: 13

Performance Assessments:

5.1 Lab/Report: Osmosis vs. Diffusion
5.2 Formal written assessment

Leadership Alignment:

The above performance assessments will embed instruction and assessment of related extended learning such as design a Osmosis or Diffusion experiment for a science fair or presentation .The 21st Century Skills used: Think creatively, work creatively with others, reason effectively, use systems thinking, make judgments and decisions, solve problems, communicate clearly, collaborate with others, access and evaluate information, use and manage information, be flexible, manage goals and time, work independently, interact effectively with others, manage projects, produce result, guide and lead others, and be responsible to others and include a formal written assessment of your project.

Standards and Competencies

Students will be able to:
5.1 Name the parts and describe the structure of the Cell Membrane
5.2 Explain the functions of the layers of the cell membrane

5.3 Describe and name the cell processes where materials flow in and out of a cell.
5.4 Explain the terms homeostasis and how cells maintain homeostasis.
5.5 Identify and name different solution strengths

BS.02.04. Performance Indicator: Safely manage biological materials, chemicals and wastes used in the laboratory.

Science: B2, B3, F4 and F5
Language Arts: 7

BS.02.04.01.a. Prepare simple chemical solutions using standard operating procedures.

BS.02.04.01.b. Prepare buffers, reagents, solutions and media.

BS.02.04.01.c. Verify the physical properties of buffers, reagents, solutions and media.

Aligned Washington State Standards

Communication - Speaking and Listening

CC: College and Career Readiness Anchor Standards for Speaking and Listening
2 - Integrate and evaluate information presented in diverse media and formats, including visually, quantitatively, and orally.

Language

CC: College and Career Readiness Anchor Standards for Language

Vocabulary Acquisition and Use

4- Determine or clarify the meaning of unknown and multiple-meaning words and phrases by using context clues, analyzing meaningful word parts, and consulting general and specialized reference materials, as appropriate.

Mathematics

CC: Mathematical Practices (MP)
1 - Make sense of problems and persevere in solving them.
2 - Reason abstractly and quantitatively.

Reading

CC: Reading for Literacy in Science and Technical Subjects

Key Ideas and Details (9-10)

2 - Determine the central ideas or conclusions of a text; trace the text's explanation or depiction of a complex process, phenomenon, or concept; provide an accurate summary of the text.

Craft and Structure (9-10)

3- Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 9–10 texts and topics.

Science

LS1D The cell is surrounded by a membrane that separates the interior of the cell from the outside world and determines which substances may enter and which may leave the cell.

NOTE: INQ, SYS, APP standards are assessed depending on the type of assessment format: Inquiry Scenario, Systems Scenario, Field Study, or Technological Design.

Writing

CC: College and Career Readiness Anchor Standards for Writing

Text Types and Purposes

2 - Write informative/explanatory texts to examine and convey complex ideas and information clearly and accurately through the effective selection, organization, and analysis of content.

4 - Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.

10 - Write routinely over extended time frames (time for research, reflection, and revision) and shorter time frames (a single sitting or a day or two) for a range of tasks, purposes, and audiences.

21st Century Skills

Check those that students will demonstrate in this course:

LEARNING & INNOVATION	INFORMATION, MEDIA & TECHNOLOGY SKILLS	LIFE & CAREER SKILLS
Creativity and Innovation x Think Creatively X Work Creatively with Others □ Implement Innovations **Critical Thinking and Problem Solving** x Reason Effectively	**Information Literacy** x Access and /evaluate Information x Use and Manage Information **Media Literacy** □ Analyze Media	**Flexibility and Adaptability** x Adapt to Change x Be Flexible **Initiative and Self-Direction** x Manage Goals and Time x Work Independently

x Use Systems Thinking x Make Judgments and Decisions x Solve Problems **Communication and Collaboration** x Communicate Clearly x Collaborate with Others	x Create Media Products **Information, Communications and Technology (ICT Literacy)** x Apply Technology Effectively	□ Be Self-Directed Learners **Social and Cross-Cultural** x Interact Effectively with Others x Work Effectively in Diverse Teams **Productivity and Accountability** x Manage Projects x Produce Results **Leadership and Responsibility** x Guide and Lead Others x Be Responsible to Others

Unit 6 - Photosynthesis & Cellular Respiration	Hours: 25

Performance Assessments:

6.1 Diagram: Processes of photosynthesis and cellular respiration. To include the inputs, outputs and energy carrying compounds.
6.2 Lab: Factors affecting the rate of photosynthesis.
6.3 Formal written assessment.
6.4 Report: Effects of Creatine

Leadership Alignment:

The above performance assessments will embed instruction and assessment for plant project, plant experiments with Cratine, and respiration data collecting projects relating to photosynthesis that could include, SAE projects, regional contests and state Fairs class or science fair projects: 21st Century Skills used: Think creatively, work creatively with others, reason effectively, use systems thinking, solve problems, communicate clearly
SAE, and the Career Development Events such as but not limited to Agronomy, Nursery/Landscape, Ag Issues, Environmental and Natural Resources, Extemporaneous and Prepared Public Speaking, Ag. Communication CDE's 21st Century Skills Used: access and /evaluate information, communicate clearly, collaborate with others, use and manage information, apply technology effectively, be flexible, manage gals and time, work independently, interact effectively with others, work effectively in diverse teams, manage projects, produce results, Guide and lead others, and be responsible to others

Standards and Competencies

Students will be able to:
6.1 Describe the role of ATP and ADP in cellular activities.
6.2 Explain how ATP is obtained and used by the cell
6.3 Identify the reactants (inputs) and products (outputs) of photosynthesis
6.4 Write the photosynthetic equation with both chemical symbols and words
6.5 Describe the role of light and pigments in the process of photosynthesis
6.6 Give a basic description of the light-dependent and light-independent (Calvin Cycle) reactions
6.7 Identify the factors that affect the rate photosynthesis occurs
6.8 Explain how autotrophs and heterotrophs obtain energy
6.9 Define/describe cellular respiration
6.10 Explain the chemical formula in both equation and words
6.11 Describe and identify the location of cellular respiration and the organelles involved
6.12 Identify the reactants (inputs) and products (outputs) of cellular respiration
6.13 Give a basic description of the three pathways the body uses to release energy
6.14 Compare and contrast photosynthesis and respiration
BS.03.01.03.b. Diagram the process by which organisms are genetically engineered for waste treatment.
BS.03.03. Performance Indicator: Use biotechnology to monitor and evaluate procedures performed in AFNR systems.
BS.03.03.01.a. Describe the selective plant breeding process.
BS.03.03.01.b. Select biotechnology tools used to monitor and direct plant breeding.
BS.03.03.01.c. Design and conduct an experiment using biotechnology tools to evaluate selectively bred plants.

Aligned Washington State Standards

Communication - Speaking and Listening

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2 - Integrate and evaluate information presented in diverse media and formats, including visually, quantitatively, and orally.

Language

CC: College and Career Readiness Anchor Standards for Language

Conventions of Standard English

1 - Demonstrate command of the conventions of standard English grammar and usage when writing or speaking.

Vocabulary Acquisition and Use

4- Determine or clarify the meaning of unknown and multiple-meaning words and phrases by using context clues, analyzing meaningful word Parts, and consulting general and specialized reference materials, as appropriate.

Mathematics

CC: Mathematical Practices (MP)
1 - Make sense of problems and persevere in solving them.
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Reading

CC: Reading for Literacy in Science and Technical Subjects

Key Ideas and Details (9-10)

2 - Determine the central ideas or conclusions of a text; trace the text's explanation or depiction of a complex process, phenomenon, or concept; provide an accurate summary of the text.

Craft and Structure (9-10)

3- Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 9–10 texts and topics.

Science

LS1A Carbon-containing compounds are the building blocks of life. Photosynthesis is the process that plant cells use to combine the energy of sunlight with molecules of carbon dioxide and water to produce energy-rich compounds that contain carbon (food) and release oxygen.
LS1B The gradual combustion of carbon-containing compounds within cells, called cellular respiration, provides the primary energy source of living organisms; and the combustion of carbon by burning of fossil fuels provides the primary energy source for most of modern society.
LS1C Cells contain specialized parts for determining its essential functions, such as regulation of cellular activities, energy capture and release, formation of proteins, waste disposal, the transfer of information, and movement.
LS1F All of the functions of the cell are based on chemical reactions. Food molecules are broken down to provide the energy and the chemical constituents needed to synthesize other molecules. Breakdown and synthesis are made possible by proteins called enzymes. Some of these enzymes enable the cell to store energy in special chemicals, such as ATP, that are needed to drive the many other chemical reactions in a cell.
NOTE: INQ, SYS, APP standards are assessed depending on the type of assessment format: Inquiry Scenario, Systems Scenario, Field Study, or Technological Design.

Writing
CC: College and Career Readiness Anchor Standards for Writing **Text Types and Purposes** 2 - Write informative/explanatory texts to examine and convey complex ideas and information clearly and accurately through the effective selection, organization, and analysis of content. 3- Write narratives to develop real or imagined experiences or events using effective technique, well-chosen details, and well-structured event sequences. **Production and Distribution of Writing** 4 - Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience. 5 - Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach. 10- Write routinely over extended time frames (time for research, reflection, and revision) and shorter time frames (a single sitting or a day or two) for a range of tasks, purposes, and audiences.

21st Century Skills
Check those that students will demonstrate in this course:

LEARNING & INNOVATION	**INFORMATION, MEDIA & TECHNOLOGY SKILLS**	**LIFE & CAREER SKILLS**
Creativity and Innovation x Think Creatively X Work Creatively with Others □ Implement Innovations **Critical Thinking and Problem Solving** x Reason Effectively x Use Systems Thinking □ Make Judgments and Decisions x Solve Problems **Communication and Collaboration** x Communicate Clearly x Collaborate with Others	**Information Literacy** x Access and /evaluate Information x Use and Manage Information **Media Literacy** □ Analyze Media □ Create Media Products **Information, Communications and Technology (ICT Literacy)** x Apply Technology Effectively	**Flexibility and Adaptability** □ Adapt to Change x Be Flexible **Initiative and Self-Direction** x Manage Goals and Time x Work Independently □ Be Self-Directed Learners **Social and Cross-Cultural** x Interact Effectively with Others x Work Effectively in Diverse Teams **Productivity and Accountability** x Manage Projects x Produce Results **Leadership and Responsibility** x Guide and Lead Others x Be Responsible to Others

Unit 7 - Genetics	Hours: 16

Performance Assessments:

7.1 Lab: Mendelian Laws and Probability
7.2 Complete a model showing the different patterns of inheritance
7.3 Formal written assessment

Leadership Alignment:

The above performance assessments will embed instruction and assessment of extended learning opportunities such as preparing a presentation of genetic probability, building a model of different inheritance patterns or creating a poster of the genetic diseases and how genetics play a role in the expression of a disease at a local or regional science fair and /or School science fair, with a demonstration: 21st Century Skills used: Think creatively, work creatively with others, reason effectively, use systems thinking, make judgments and decisions, solve problems, communicate clearly, collaborate with others, access and /evaluate information, use and manage information, apply technology effectively, adapt to change, be flexible, manage goals and time, work independently, interact effectively with others, work effectively in diverse teams, manage projects, produce results, guide and lead others.

Standards and Competencies

Students will be able to:
7.1 Describe, explain and apply Greg Mendel's four laws of genetics
7.2 Use the Punnett Square to determine probability
7.3 Explain how geneticists use the principles of probability
7.4 Describe the inheritance patterns that exist aside from simple dominance
7.5 Build a model to show the different inheritance patterns
7.6 Explain how Mendel's principles apply to all organisms
7.7 Describe several genetic diseases and how genetics play a role in the expression of a disease
BS.03.01. Performance Indicator: Evaluate the application of genetic engineering to improve products of AFNR systems.
Math
BS.03.01.01.a. Explain biological, social, agronomic and economic reasons for genetic modification of

eukaryotes.
BS.03.01.01.b. Diagram the processes and describe the techniques used to produce transgenic eukaryotes.
BS.03.01.01.c. Design and conduct an experiment to evaluate an existing transgenic eukaryote.
BS.03.01.03.a. Compare and contrast the use of natural organisms and genetically engineered organisms in the treatment of wastes.
BS.03.01.03.b. Diagram the process by which organisms are genetically engineered for waste treatment.
BS.03.01.03.c. Monitor and evaluate the treatment of a waste product using a genetically engineered organism

Aligned Washington State Standards

Communication - Speaking and Listening

CC: College and Career Readiness Anchor Standards for Speaking and Listening
Comprehension and Collaboration
1 - Prepare for and participate effectively in a range of conversations and collaborations with diverse partners, building on others' ideas and expressing their own clearly and persuasively.
2 - Integrate and evaluate information presented in diverse media and formats, including visually, quantitatively, and orally.
Presentation of Knowledge and Ideas.
3- Present information, findings, and supporting evidence such that listeners can follow the line of reasoning and the organization, development, and style are appropriate to task, purpose, and audience.

Language

CC: College and Career Readiness Anchor Standards for Language

Conventions of Standard English

1 - Demonstrate command of the conventions of standard English grammar and usage when writing or speaking.

Vocabulary Acquisition and Use

4- Determine or clarify the meaning of unknown and multiple-meaning words and phrases by using context clues, analyzing meaningful word parts, and consulting general and specialized reference materials, as appropriate.

Mathematics

CC: Mathematical Practices (MP)

1 - Make sense of problems and persevere in solving them.

2 - Reason abstractly and quantitatively.

Reading

CC: Reading for Literacy in Science and Technical Subjects

Key Ideas and Details (9-10)

2 - Determine the central ideas or conclusions of a text; trace the text's explanation or depiction of a complex process, phenomenon, or concept; provide an accurate summary of the text.

Craft and Structure (9-10)

3- Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 9–10 texts and topics.

Science

LS1I Egg and sperm cells are formed by a process called meiosis in which each resulting cell contains only one representative chromosome from each pair found in the original cell. Recombination of genetic information during meiosis scrambles the genetic information, allowing for new genetic combinations and characteristics in the offspring. Fertilization restores the original number of chromosome pairs and reshuffles the genetic information, allowing for variation among offspring.

NOTE: INQ, SYS, APP standards are assessed depending on the type of assessment format: Inquiry Scenario, Systems Scenario, Field Study, or Technological Design.

Writing

CC: College and Career Readiness Anchor Standards for Writing

Text Types and Purposes

1 - Write arguments to support claims in an analysis of substantive topics or texts, using valid reasoning and relevant and sufficient evidence.

2 - Write informative/explanatory texts to examine and convey complex ideas and information clearly and accurately through the effective selection, organization, and analysis of content.

3- Write narratives to develop real or imagined experiences or events using effective technique, well-chosen details, and well-structured event sequences.

Production and Distribution of Writing

4 - Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.
5 - Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach.
6 - Use technology, including the Internet, to produce and publish writing and to interact and collaborate with others. Research to Build and **Present Knowledge**
8 - Gather relevant information from multiple print and digital sources, assess the credibility and accuracy of each source, and integrate the information while avoiding plagiarism.
9 - Draw evidence from literary or informational texts to support analysis, reflection, and research.
Range of Writing
10- Write routinely over extended time frames (time for research, reflection, and revision) and shorter time frames (a single sitting or a day or two) for a range of tasks, purposes, and audiences.

21st Century Skills
Check those that students will demonstrate in this course:

LEARNING & INNOVATION	**INFORMATION, MEDIA & TECHNOLOGY SKILLS**	**LIFE & CAREER SKILLS**
Creativity and Innovation x Think Creatively X Work Creatively with Others □ Implement Innovations **Critical Thinking and Problem Solving** x Reason Effectively x Use Systems Thinking x Make Judgments and Decisions x Solve Problems **Communication and Collaboration** x Communicate Clearly x Collaborate with Others	**Information Literacy** x Access and /evaluate Information x Use and Manage Information **Media Literacy** □ Analyze Media □ Create Media Products **Information, Communications and Technology (ICT Literacy)** x Apply Technology Effectively	**Flexibility and Adaptability** x Adapt to Change x Be Flexible **Initiative and Self-Direction** x Manage Goals and Time x Work Independently □ Be Self-Directed Learners **Social and Cross-Cultural** x Interact Effectively with Others x Work Effectively in Diverse Teams **Productivity and Accountability** x Manage Projects x Produce Results **Leadership and Responsibility** x Guide and Lead Others □ Be Responsible to Others

Unit 8 – Cell Division/RNA/DNA	**Hours: 15**

Performance Assessments:

8.1 Model/Diagram: Mitosis and Meiosis Comparison
8.2 Model: Build and label a DNA molecule
8.3 Model: Cell Cycle
8.4 Predict the outcome of genetic crosses with two characteristics leading to variation
8.5 Illustrate and explain the process of protein synthesis
8.4 Formal Assessment

Leadership Alignment:

Assessments will embed instruction and assessment of related extended learning opportunities such as participation in a public presentation of a mitosis and meiosis comparison poster, creating a genetic crosses project to present to a grade school group possibly participate in a Environmental and Natural, Extemporaneous and Prepared Public Speaking event about genetically modified foods: 21st Century Skills used: think creatively, work creatively with others, reason effectively, use systems thinking, make judgments and decisions, Solve Problems, Communicate Clearly, Collaborate with Others, Access and /evaluate Information, Use and Manage Information, apply technology effectively, adapt to change, be flexible, manage goals and time, work independently, interact effectively with others, work effectively in diverse teams, and manage projects, produce results, guide and lead others.

Standards and Competencies

Students will be able to:
8.1 Compare the number on chromosomes in normal diploid cells and gametes
8.2 Summarize the events of meiosis
8.3 Explain the cell cycle and draw a model to represent the cell cycle with meiosis
8.4 Describe the process of mitosis
8.5 Compare and contrast mitosis and meiosis
8.6 Explain why cells divide and the problems caused by cell growth in an individual cell
8.7 Describe the overall structure of the DNA molecule
8.8 Describe the relationship between DNA and genes
8.9 Explain the process of DNA replication
8.10 Explain the relationship between genes and proteins
8.11 Describe transcription and the editing of RNA
8.12 Describe the process of translation
8.13 Explain how the genetic code determines the proteins that are translated from RNA and decode a strand of RNA
8.14 Describe a typical gene
8.15 Explain how most genes are controlled in eukaryotic cells

8.16 Relate gene regulation to development
BS.03.01. Performance Indicator: Evaluate the application of genetic engineering to improve products of AFNR systems.
Math
BS.03.01.01.a. Explain biological, social, agronomic and economic reasons for genetic modification of eukaryotes.
BS.03.01.01.b. Diagram the processes and describe the techniques used to produce transgenic eukaryotes.
BS.03.01.01.c. Design and conduct an experiment to evaluate an existing transgenic eukaryote.
BS.02.05.02.a. Explain the structures of DNA and RNA and how genotype influences phenotype.
BS.02.05.02.b. Explain the molecular basis for heredity and the tools and techniques used in DNA and RNA manipulations.
BS.02.05.02.c. Analyze factors that influence gene expression.

Aligned Washington State Standards

Communication - Speaking and Listening
CC: College and Career Readiness Anchor Standards for Speaking and Listening 2 - Integrate and evaluate information presented in diverse media and formats, including visually, quantitatively, and orally.
Language

CC: College and Career Readiness Anchor Standards for Language

Vocabulary Acquisition and Use

4- Determine or clarify the meaning of unknown and multiple-meaning words and phrases by using context clues, analyzing meaningful word parts, and consulting general and specialized reference materials, as appropriate.

Mathematics

CC: Mathematical Practices (MP)

1 - Make sense of problems and persevere in solving them.

2 - Reason abstractly and quantitatively.

Reading

CC: Reading for Literacy in Science and Technical Subjects

Key Ideas and Details (9-10)

2 - Determine the central ideas or conclusions of a text; trace the text's explanation or depiction of a complex process, phenomenon, or concept;
provide an accurate summary of the text.

Craft and Structure (9-10)

3- Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 9–10 texts and topics.

Science

LS1E The genetic information responsible for inherited characteristics is encoded in the DNA molecules in chromosomes. DNA is composed of four subunits (A,T,C,G). The sequence of subunits in a gene specifies the amino acids needed to make a protein. Proteins express inherited traits (e.g., eye color, hair texture) and carry out most cell function.

LS1G Cells use the DNA that forms their genes to encode enzymes and other proteins that allow a cell to grow and divide to produce more cells, and respond to the environment.

LS1H Genes are carried on chromosomes. Animal cells contain two copies of each chromosome with genetic information that regulate body structure and functions. Cells divide by a process called mitosis, in which the genetic information is copied so that each new cell contains exact copies of the original chromosomes.

LS1I Egg and sperm cells are formed by a process called meiosis in which each resulting cell contains only one representative chromosome from each pair found in the original cell. Recombination of genetic information during meiosis scrambles the genetic information, allowing for new genetic combinations and characteristics in the offspring. Fertilization restores the original number of chromosome pairs and reshuffles the genetic information, allowing for variation among offspring.

LS3B Random changes in the genetic makeup of cells and organisms (mutations) can cause changes in their physical characteristics or behaviors. If the genetic mutations occur in eggs or sperm cells, the changes will be inherited by offspring. While many of these changes will be harmful, a small minority may allow the offspring to better survive and reproduce.

NOTE: INQ, SYS, APP standards are assessed depending on the type of assessment format: Inquiry Scenario, Systems Scenario, Field Study, or Technological Design.

Writing

CC: College and Career Readiness Anchor Standards for Writing

Text Types and Purposes

2- Write informative/explanatory texts to examine and convey complex ideas and information clearly and accurately through the effective selection, organization, and analysis of content.

3- Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.

10-Write routinely over extended time frames (time for research, reflection, and revision) and shorter time frames (a single sitting or a day or two) for a range of tasks, purposes, and audiences.

21st Century Skills

Check those that students will demonstrate in this course:

LEARNING & INNOVATION

Creativity and Innovation
x Think Creatively
X Work Creatively with Others
 Implement Innovations

Critical Thinking and Problem Solving
x Reason Effectively
x Use Systems Thinking
x Make Judgments and Decisions
x Solve Problems

Communication and Collaboration
x Communicate Clearly
x Collaborate with Others

INFORMATION, MEDIA & TECHNOLOGY SKILLS

Information Literacy
x Access and /evaluate Information
x Use and Manage Information

Media Literacy
 Analyze Media
x Create Media Products

Information, Communications and Technology (ICT Literacy)
x Apply Technology Effectively

LIFE & CAREER SKILLS

Flexibility and Adaptability
x Adapt to Change
x Be Flexible

Initiative and Self-Direction
x Manage Goals and Time
x Work Independently
 Be Self-Directed Learners

Social and Cross-Cultural
x Interact Effectively with Others
x Work Effectively in Diverse Teams

Productivity and Accountability
x Manage Projects
x Produce Results

Leadership and Responsibility
x Guide and Lead Others
x Be Responsible to Others

Unit - 9 Ecology /Ecosystems — Hours: 14

Performance Assessments:

9.1 Field Study: Population density. Present finding to class.
9.2 Evaluate conditions needed for population growth and explain factors that limit population growth
9.3 Field Study: Life in a square meter
9.4 Compare the biodiversity of different ecosystems
9.5 Explain how matter and energy flows in an ecosystem
9.6 Analyze whether or not a system is changing or in equilibrium.
9.6 Formal Assessment
BS.01.01. Performance Indicator: Distinguish major innovators, historical developments and potential applications of biotechnology in agriculture.

Leadership Alignment:

Students will create a project as an extended learning opportunities include regional fairs, potential state Fairs and local science fair presentations using population density experiments, ecosystems and systems analysis of change projects and Biome models. The 21st Century Skills used: Adapt to change, be flexible, manage goals and time, work independently, interact effectively with others, work effectively in diverse teams, manage projects, produce results, guide and lead others, be responsible to others, participate in Career Development Events such as but not limited to Agronomy, Nursery/Landscape, Ag Issues, Environmental and Natural Resources, extemporaneous and prepared Public Speaking.21st Century Skills used: Think creatively, work creatively with others, reason effectively use systems thinking, make judgments and decisions, solve problems, communicate clearly, collaborate with others, create media products, and apply technology effectively while preparing for contests and presentations relating to population density, matter and energy flows and ecosystems.

Standards and Competencies

Students will be able to:
9.1 Evaluate the conditions necessary for rapid population growth (e.g., given adequate living and nonliving resources and no disease or predators, populations of an organism increase at rapid rates).
9.2 Given ecosystem data, calculate the population density of an organism.
9.3 Explain factors, including matter and energy, in the environment that limit the growth of plant and animal populations in natural ecosystems.
9.4 Draw a systems diagram to illustrate and explain why introduced (nonnative) species often do poorly and have a tendency to die out, as well as why they sometimes do very well and force out native species
9.5 Compare the biodiversity of organisms in different types of ecosystems (e.g., rain forest, grassland, desert) noting the interdependencies and interrelationships among the organisms in these different ecosystems.
9.6 Explain how the concept of sustainable development may be applied to a current resource issue in the state of Washington
BS.01.01. Performance Indicator: Distinguish major innovators, historical developments and potential applications of biotechnology in agriculture.

BS.01.01.01.a. Define biotechnology and explore the historical impact it has had on agriculture.
BS.01.01.01.b. Create a timeline and use it to explain the developmental progression of biotechnology.
BS.01.01.01.c. Research and report on the major innovators and milestones in the development of biotechnology
BS.01.01.02.a. Investigate current applications of biotechnology in agriculture.
BS.01.01.02.b. Research and report on current work being done in agricultural biotechnology.
BS.01.01.02.c. Analyze the scope and impact of agricultural biotechnology in today's global society..

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Aligned Washington State Standards

Communication - Speaking and Listening

CC: College and Career Readiness Anchor Standards for Speaking and Listening
Comprehension and Collaboration
1 - Prepare for and participate effectively in a range of conversations and collaborations with diverse partners, building on others' ideas and expressing their own clearly and persuasively.
2 - Integrate and evaluate information presented in diverse media and formats, including visually, quantitatively, and orally.
Presentation of Knowledge and Ideas
3- Present information, findings, and supporting evidence such that listeners can follow the line of reasoning and the organization, development, and style are appropriate to task, purpose, and audience.

Language
CC: College and Career Readiness Anchor Standards for Language **Vocabulary Acquisition and Use** 4- Determine or clarify the meaning of unknown and multiple-meaning words and phrases by using context clues, analyzing meaningful word parts, and consulting general and specialized reference materials, as appropriate.
Mathematics
CC: Mathematical Practices (MP) 1 - Make sense of problems and persevere in solving them. 2 - Reason abstractly and quantitatively.
Reading
CC: Reading for Literacy in Science and Technical Subjects **Key Ideas and Details (9-10)** 2 - Determine the central ideas or conclusions of a text; trace the text's explanation or depiction of a complex process, phenomenon, or concept; provide an accurate summary of the text. **Craft and Structure (9-10)** 3- Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 9–10 texts and topics.
Science
LS2A Matter and energy is transferred and cycled through living and nonliving components in ecosystems. The cycling of matter and energy is important for maintaining the health and sustainability of an ecosystem LS2B Living organisms have the capacity to produce very large populations. Population density is the number of individuals of a particular population living in a given amount of space. LS2C Population growth is limited by the availability of matter and energy found in resources, the size of the environment, and the presence of competing and/or predatory organisms. LS2E Interrelationships of organisms may generate ecosystems that are stable for hundreds or thousands of years. Biodiversity refers to the different kinds of organisms in specific ecosystems or on the planet as a whole. LS2F The concept of sustainable development supports adoption of policies that enable people to obtain the resources they need today, without limiting the ability of future generations to meet their own needs. Sustainable processes include substituting renewable for nonrenewable resources, recycling, and using fewer resources. LS2-1 Use mathematical and/or computational representations to support explanations of factors that affect carrying capacity of ecosystems at different scales. LS2-2 Use mathematical representations to support and revise explanations based on evidence about factors affecting biodiversity and populations in ecosystems of different scales. LS2-3 Construct and revise an explanation based on evidence for the cycling of matter and flow of energy in aerobic and anaerobic conditions. LS2-4 Use mathematical representations to support claims for the cycling of matter and flow of energy among organisms in an ecosystem. LS2-5 Develop a model to illustrate the role of photosynthesis and cellular respiration in the cycling of carbon among the biosphere,

atmosphere, hydrosphere, and geosphere.
LS2-6 Evaluate the claims, evidence, and reasoning that the complex interactions in ecosystems maintain relatively consistent numbers and types of organisms in stable conditions, but changing conditions may result in a new ecosystem.
LS2-7 Design, evaluate, and refine a solution for reducing the impacts of human activities on the environment and biodiversity
LS2-8 Evaluate the evidence for the role of group behavior on individual and species' chances to survive and reproduce.
NOTE: INQ, SYS, APP standards are assessed depending on the type of assessment format: Inquiry Scenario, Systems Scenario, Field Study, or Technological Design.

Writing

CC: College and Career Readiness Anchor Standards for Writing
Text Types and Purposes
2 - Write informative/explanatory texts to examine and convey complex ideas and information clearly and accurately through the effective selection, organization, and analysis of content.
4 - Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.
10 -Write routinely over extended time frames (time for research, reflection, and revision) and shorter time frames (a single sitting or a day or two) for a range of tasks, purposes, and audiences.

21st Century Skills

Check those that students will demonstrate in this course:

LEARNING & INNOVATION

Creativity and Innovation
x Think Creatively
X Work Creatively with Others
□ Implement Innovations

Critical Thinking and Problem Solving
x Reason Effectively
x Use Systems Thinking
x Make Judgments and Decisions
x Solve Problems

Communication and Collaboration
x Communicate Clearly
x Collaborate with Others

INFORMATION, MEDIA & TECHNOLOGY SKILLS

Information Literacy
x Access and /evaluate Information
x Use and Manage Information

Media Literacy
□ Analyze Media
x Create Media Products

Information, Communications and Technology (ICT Literacy)
x Apply Technology Effectively

LIFE & CAREER SKILLS

Flexibility and Adaptability
x Adapt to Change
x Be Flexible

Initiative and Self-Direction
x Manage Goals and Time
x Work Independently
□ Be Self-Directed Learners

Social and Cross-Cultural
x Interact Effectively with Others
x Work Effectively in Diverse Teams

Productivity and Accountability
x Manage Projects
x Produce Results

Leadership and Responsibility
x Guide and Lead Others

		x Be Responsible to Others

Unit 10 – Plant Propagation	Hours: 15

Performance Assessments:

10.1 Propagate plants using different methods
10.2 Apply knowledge in a production greenhouse setting as part of a management team.
10.3 Story Book: Create a story book, read to elementary students and teach plant requirements.
10.4 Use tools of mathematics to solve greenhouse production problems.
10.5 Use a variety of soils to enhance plant growth

Leadership Alignment:

The above performance assessments will embed instruction and assessment of FFA activities such as 'PALS programs with the local elementary school relating to plant propagation and plant management Students will create a story book, read to elementary students and teach plant growth requirements to younger students and their peers. The 21st Century Skills used: Think creatively work creatively with others, reason effectively, use systems thinking, make judgments and decisions, solve problems, communicate clearly, collaborate with others, be flexible, manage goals and time, work effectively in diverse teams, guide and lead others be responsible to others, and manage projects for presentations.

FFA related extended learning opportunities include plant sale: 21st Century Skills used:
Use and manage information, create media products, apply technology effectively , be flexible, manage goals and time, work independently, interact effectively with others, work effectively in diverse teams, manage projects, produce results, guide and lead others, be responsible to others.

Demonstrate a scientific experiment to a class: 21st Century Skills used:
Use and manage information, create media products, apply technology effectively , be flexible, manage goals and time, work independently, interact effectively with others, work effectively in diverse teams, manage projects, produce results, guide and lead others, and be responsible to others.

Standards and Competencies

Students will be able to:
10.1 Prepare propagation media
10.2 Select and collect propagation materials
10.3 Demonstrate propagation by sexual and asexual methods
10.4 Demonstrate environmental controls for propagation materials (e.g., moisture, temperature, light)
10.5 Transplant rooted propagation materials
10.6 Identify asexual and sexual plant propagation methods.
10.7 Work collaboratively with other students to solve a problem.
10.8 Select and collect soil samples and determine the soil profile.
BS.03.03. Performance Indicator: Use biotechnology to monitor and evaluate procedures performed in AFNR systems.
Science: A2, A3, C4, C6 and F5
Language Arts: 7 and 8
BS.03.03.01.a. Describe the selective plant breeding process.
BS.03.03.01.b. Select biotechnology tools used to monitor and direct plant breeding.
BS.03.03.01.c. Design and conduct an experiment using biotechnology tools to evaluate selectively bred plants.

Aligned Washington State Standards

Communication - Speaking and Listening

CC: College and Career Readiness Anchor Standards for Speaking and Listening
2 - Integrate and evaluate information presented in diverse media and formats, including visually, quantitatively, and orally.

Mathematics

CC: Mathematical Practices (MP)

1 - Make sense of problems and persevere in solving them.
2 - Reason abstractly and quantitatively.

Science

SYSA Feedback is a process in which the output of a system provides information used to regulate the operation of the system. Positive feedback increases the disturbance to a system. Negative feedback reduces the disturbance to a system.
SYSB Represent the system with a diagram specifying components, boundaries, flows and feedbacks
LS1F All of the functions of the cell are based on chemical reactions. Food molecules are broken down to provide the energy and the chemical constituents needed to synthesize other molecules. Breakdown and synthesis are made possible by proteins called enzymes

Writing

CC: College and Career Readiness Anchor Standards for Writing
Text Types and Purposes
1 - Write arguments to support claims in an analysis of substantive topics or texts, using valid reasoning and relevant and sufficient evidence.
2 - Write informative/explanatory texts to examine and convey complex ideas and information clearly and accurately through the effective selection, organization, and analysis of content.
3- Write narratives to develop real or imagined experiences or events using effective technique, well-chosen details, and well-structured event sequences. Production and Distribution of Writing
4 - Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.
5 - Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach.
6 - Use technology, including the Internet, to produce and publish writing and to interact and collaborate with others. Research to Build and
Present Knowledge
8 - Gather relevant information from multiple print and digital sources, assess the credibility and accuracy of each source, and integrate the information while avoiding plagiarism.
9 - Draw evidence from literary or informational texts to support analysis, reflection, and research. Range of Writing
10 -Write routinely over extended time frames (time for research, reflection, and revision) and shorter time frames (a single sitting or a day or two) for a range of tasks, purposes, and audiences.

21st Century Skills

Check those that students will demonstrate in this course:

LEARNING & INNOVATION	**INFORMATION, MEDIA & TECHNOLOGY SKILLS**	**LIFE & CAREER SKILLS**
Creativity and Innovation x Think Creatively X Work Creatively with Others □ Implement Innovations	**Information Literacy** x Access and /evaluate Information x Use and Manage Information	**Flexibility and Adaptability** □ Adapt to Change x Be Flexible
Critical Thinking and Problem Solving	**Media Literacy**	**Initiative and Self-Direction** x Manage Goals and Time

x Reason Effectively x Use Systems Thinking x Make Judgments and Decisions x Solve Problems **Communication and Collaboration** x Communicate Clearly x Collaborate with Others	□ Analyze Media x Create Media Products **Information, Communications and Technology (ICT Literacy)** x Apply Technology Effectively	x Work Independently □ Be Self-Directed Learners **Social and Cross-Cultural** x Interact Effectively with Others x Work Effectively in Diverse Teams **Productivity and Accountability** x Manage Projects x Produce Results **Leadership and Responsibility** x Guide and Lead Others x Be Responsible to Others

Unit 11 – Plant Identification and Classification	Hours: 6

Performance Assessments:
11.1 Formal Assessment 11.2 Apply knowledge in a production greenhouse setting as part of a management team.
Leadership Alignment:
The above performance assessments will embed instruction and assessment of related extended learning opportunities such as Career Development Events such as but not limited to Nursery/Landscape, Floral Design and prepared public speaking. Developing a marketing plan for a plant sale and presenting the plan to a panel of judges for formal assessment. The 21st Century Skills: Think creatively, work creatively with others, reason effectively, use systems thinking, make judgments and decisions, solve problems, communicate clearly, collaborate with others, access and /evaluate Information, use and manage Information create media products, apply technology effectively, adapt to change, be flexible, manage goals and time, work independently, interact effectively with others, work effectively in diverse teams, manage projects, produce results, guide and lead others, be responsible to others

Standards and Competencies

Students will be able to:
11.1 Identify plants by scientific and common names
11.2 Classify plants botanically and list environmental preferences of plants (e.g. shade, sun, wind, moisture and salt)
11.3 Classify plants as monocots or dicots
11.4 Classify plants as annuals, biennials and perennials
11.5 Identify plants appropriate to a region
11.6 Classify plants according to growth habit
11.7 Apply knowledge in a production greenhouse setting as part of a management team
11.8 Work collaboratively with other students to solve a problem.

BS.03.03. Performance Indicator: Use biotechnology to monitor and evaluate procedures performed in AFNR systems.

Science: A2, A3, C4, C6 and F5
Language Arts: 7 and 8

BS.03.03.01.a. Describe the selective plant breeding process.
BS.03.03.01.b. Select biotechnology tools used to monitor and direct plant breeding.
BS.03.03.01.c. Design and conduct an experiment using biotechnology tools to evaluate selectively bred plants.
BS.02.04.02.a. Identify and describe hazards associated with biological and chemical materials.
BS.02.04.02.b. Inventory biological and chemical materials, and maintain accurate records of supplies and expiration dates.
BS.02.04.02.c. Order, stock and maintain supplies of biological and chemical materials.

Aligned Washington State Standards

Communication - Speaking and Listening

CC: College and Career Readiness Anchor Standards for Speaking and Listening
2 - Integrate and evaluate information presented in diverse media and formats, including visually, quantitatively, and orally.

Language

CC: College and Career Readiness Anchor Standards for Language

Vocabulary Acquisition and Use

4- Determine or clarify the meaning of unknown and multiple-meaning words and phrases by using context clues, analyzing meaningful word parts, and consulting general and specialized reference materials, as appropriate.

Mathematics

CC: Mathematical Practices (MP)
1 - Make sense of problems and persevere in solving them.
2 - Reason abstractly and quantitatively.

Reading

CC: Reading for Literacy in Science and Technical Subjects
3- Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 9–10 texts and topics.

Science

LS3E Biological classifications are based on how organisms are related, reflecting their evolutionary history. Scientists infer relationships from physiological traits, genetic information, and the ability of two organisms to produce fertile offspring.

Writing

CC: College and Career Readiness Anchor Standards for Writing

Text Types and Purposes

2 - Write informative/explanatory texts to examine and convey complex ideas and information clearly and accurately through the effective selection, organization, and analysis of content.
4 - Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.
10 -Write routinely over extended time frames (time for research, reflection, and revision) and shorter time frames (a single sitting or a day or two) for a range of tasks, purposes, and audiences

21st Century Skills
Check those that students will demonstrate in this course:

LEARNING & INNOVATION	INFORMATION, MEDIA & TECHNOLOGY SKILLS	LIFE & CAREER SKILLS
Creativity and Innovation x Think Creatively X Work Creatively with Others □ Implement Innovations **Critical Thinking and Problem Solving** x Reason Effectively x Use Systems Thinking x Make Judgments and Decisions x Solve Problems **Communication and Collaboration** x Communicate Clearly x Collaborate with Others	**Information Literacy** x Access and /evaluate Information x Use and Manage Information **Media Literacy** □ Analyze Media x Create Media Products **Information, Communications and Technology (ICT Literacy)** x Apply Technology Effectively	**Flexibility and Adaptability** x Adapt to Change x Be Flexible **Initiative and Self-Direction** x Manage Goals and Time x Work Independently □ Be Self-Directed Learners **Social and Cross-Cultural** x Interact Effectively with Others x Work Effectively in Diverse Teams **Productivity and Accountability** x Manage Projects x Produce Results **Leadership and Responsibility** x Guide and Lead Others x Be Responsible to Others

Unit 12 – Plant Physiology and Growth	Hours: 12

Performance Assessments:
12.1 Model: Flower model with parts labeled and functions described 12.2 Model: Roots and their parts 12.3 Model: Plant parts and functions described 12.2 Formal Assessment

Leadership Alignment:

The above performance assessments will embed instruction and assessment of Demonstrating a plant physiology scientific experiment to a class or small group. The 21st Century Skills used: Use and manage information, create media products, apply technology effectively , be flexible, manage goals and time, work independently, interact effectively with others, work effectively in diverse teams, manage projects, produce results, guide and lead others, be responsible to others.

FFA related extended learning opportunities include regional & state Fair poster contests about the functioning parts of a plant: The 21st Century Skills used: Adapt to change, be flexible, manage goals and time, work independently, interact effectively with others, work effectively in diverse teams, manage projects, produce results, guide and lead others, and be responsible to others

Standards and Competencies

Students will be able to:
12.1 Identify plant parts and structures
12.2 Describe woody and herbaceous plants
12.3 Identify flower types and inflorescence
12.4 List the requirements for health plant growth
12.5 Identify taproot and fibrous root systems
12.6 Identify the different between evergreen and deciduous plants
12.7 Apply knowledge in a production greenhouse setting as part of a management team
12.8 Explain the importance of photosynthesis and how plants use it to produce food.
12.9 Explain metabolic pathways and cellular respiration
12.10 Explain the role of enzymes in the metabolic pathway.
BS.02.04.02.a. Identify and describe hazards associated with biological and chemical materials.
BS.02.04.02.b. Inventory biological and chemical materials, and maintain accurate records of supplies and expiration dates.
BS.02.04.02.c. Order, stock and maintain supplies of biological and chemical materials.

Aligned Washington State Standards

Communication - Speaking and Listening
CC: College and Career Readiness Anchor Standards for Speaking and Listening 2 - Integrate and evaluate information presented in diverse media and formats, including visually, quantitatively, and orally.
Mathematics
CC: Mathematical Practices (MP) 1 - Make sense of problems and persevere in solving them. 2 - Reason abstractly and quantitatively.
Reading
CC: Reading for Literacy in Science and Technical Subjects **Key Ideas and Details (9-10)** 2 - Determine the central ideas or conclusions of a text; trace the text's explanation or depiction of a complex process, phenomenon, or concept; Provide an accurate summary of the text. **Craft and Structure (9-10)** 3- Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or Technical context relevant to grades 9–10 texts and topics.
Science
LS3E Biological classifications are based on how organisms are related, reflecting their evolutionary history. Scientists infer relationships from physiological traits, genetic information, and the ability of two organisms to produce fertile offspring.
Writing
CC: College and Career Readiness Anchor Standards for Writing **Text Types and Purposes** 2 - Write informative/explanatory texts to examine and convey complex ideas and information clearly and accurately through the effective Selection, organization, and analysis of content. 4 - Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience... 10 -Write routinely over extended time frames (time for research, reflection, and revision) and shorter time frames (a single sitting or a day or two) for a range of tasks, purposes, and audiences

21st Century Skills
Check those that students will demonstrate in this course:

LEARNING & INNOVATION	INFORMATION, MEDIA & TECHNOLOGY SKILLS	LIFE & CAREER SKILLS
Creativity and Innovation x Think Creatively X Work Creatively with Others □ Implement Innovations **Critical Thinking and Problem Solving** □ Reason Effectively x Use Systems Thinking x Make Judgments and Decisions x Solve Problems **Communication and Collaboration** x Communicate Clearly x Collaborate with Others	**Information Literacy** x Access and /evaluate Information x Use and Manage Information **Media Literacy** □ Analyze Media □ Create Media Products **Information, Communications and Technology (ICT Literacy)** x Apply Technology Effectively	**Flexibility and Adaptability** □ Adapt to Change x Be Flexible **Initiative and Self-Direction** x Manage Goals and Time x Work Independently □ Be Self-Directed Learners **Social and Cross-Cultural** x Interact Effectively with Others x Work Effectively in Diverse Teams **Productivity and Accountability** x Manage Projects x Produce Results **Leadership and Responsibility** x Guide and Lead Others x Be Responsible to Others

Unit 13 –Evolution/Plants	Hours: 10

Performance Assessments:
13.1 : Class activity: Compare Natural selection and Evolution 13.2: Lab activity: Analyze fossils and interpret what they reveal about the history of life on earth. 13.3: Class discussion: The environment and natural selection.

Leadership Alignment:

The above performance assessments will embed instruction and assessment of a mini PALS lesson on Fossils those students will present to a elementary class: Science fair project focusing on follies and history of life on earth. 21st Century Skills; Adapt to change, be flexible, manage goals and time, work independently, be self-directed learners, interact effectively with others, work effectively in diverse teams, manage projects, produce results, guide and lead others, be responsible to others

The above performance assessments will embed instruction and assessment of Information poster about Evolution and Natural selection for the school science fair. Students will present and take questions from participants. 21st Century skills: Think creatively, work creatively with others, reason effectively, use systems thinking, make judgments and decisions, solve problems, communicate clearly, collaborate with others, access and /evaluate information, use and manage information, analyze media, create media products

Standards and Competencies

Students will be able to:
13.1 Identify why organisms produce more offspring that can survive.
13.2 Explain biological evolution in terms of natural selection and predict the effects of changing a factor.
13.3 Use various methods to track selection pressures
13.4 Use literature to explain bacterial resistance.
13.5 Explain the emergence of new microbes in relation to natural selection.
13.6 Name three biological factors that cause variation among offspring and future generations
13.7 Define genetic mutation and explain the effect on evolution of a species
13.8 Formulate a logical argument for biological evolution based of evidence
BS.01.01. Performance Indicator: Distinguish major innovators, historical developments and potential applications of biotechnology in agriculture.
Science: E2, F6 and G3
Language Arts: 8
Social Studies: 2b, 8a, 8c and 8e
BS.01.01.01.a. Define biotechnology and explore the historical impact it has had on agriculture.
BS.01.01.01.b. Create a timeline and use it to explain the developmental progression of biotechnology.
BS.01.01.01.c. Research and report on the major innovators and milestones in

the development of
biotechnology.

Aligned Washington State Standards

Communication - Speaking and Listening

CC: College and Career Readiness Anchor Standards for Speaking and Listening

Comprehension and Collaboration

1 - Prepare for and participate effectively in a range of conversations and collaborations with diverse partners, building on others' ideas and Expressing their own clearly and persuasively.

2 - Integrate and evaluate information presented in diverse media and formats, including visually, quantitatively, and orally.

Presentation of Knowledge and Ideas

3- Present information, findings, and supporting evidence such that listeners can follow the line of reasoning and the organization, development, and style are appropriate to task, purpose, and audience.

Language

CC: College and Career Readiness Anchor Standards for Language

Conventions of Standard English

1 - Demonstrate command of the conventions of standard English grammar and usage when writing or speaking.

Vocabulary Acquisition and Use

4- Determine or clarify the meaning of unknown and multiple-meaning words and phrases by using context clues, analyzing meaningful word parts, and consulting general and specialized reference materials, as appropriate.

Science

LS4-1 Communicate scientific information that common ancestry and biological evolution are supported by multiple lines of empirical evidence

LS4-2 Construct an explanation based on evidence that the process of evolution primarily results from four factors: (1) the potential for a species to increase in number, (2) the heritable genetic variation of individuals in a species due to mutation and sexual reproduction, (3) competition for limited resources, and (4) the proliferation of those organisms that are better able to survive and reproduce in the environment.

LS4-3 Apply concepts of statistics and probability to support explanations that organisms with an advantageous heritable trait tend to increase in proportion to organisms lacking this trait.

LS4-4 Construct an explanation based on evidence for how natural selection leads to adaptation of populations

LS4-5 Evaluate the evidence supporting claims that changes in environmental conditions may result in: (1) increases in the number of individuals of some species, (2) the emergence of new species over time, and (3) the extinction of other species

LS4-6 Create or revise a simulation to test a solution to mitigate adverse impacts of human activity on biodiversity.*

NOTE: INQ, SYS, APP standards are assessed depending on the type of assessment format: Inquiry Scenario, Systems Scenario, Field Study, or Technological Design.

21st Century Skills
Check those that students will demonstrate in this course:

LEARNING & INNOVATION **Creativity and Innovation** x Think Creatively X Work Creatively with Others □ Implement Innovations **Critical Thinking and Problem Solving** x Reason Effectively □ Use Systems Thinking x Make Judgments and Decisions x Solve Problems **Communication and Collaboration** x Communicate Clearly x Collaborate with Others	**INFORMATION, MEDIA & TECHNOLOGY SKILLS** **Information Literacy** x Access and /evaluate Information x Use and Manage Information **Media Literacy** x Analyze Media x Create Media Products **Information, Communications and Technology (ICT Literacy)** □ Apply Technology Effectively	**LIFE & CAREER SKILLS** **Flexibility and Adaptability** x Adapt to Change x Be Flexible **Initiative and Self-Direction** x Manage Goals and Time x Work Independently □ Be Self-Directed Learners **Social and Cross-Cultural** x Interact Effectively with Others x Work Effectively in Diverse Teams **Productivity and Accountability** x Manage Projects x Produce Results **Leadership and Responsibility** x Guide and Lead Others x Be Responsible to Others

Unit 14 – Infection/ Plants vs. People	**Hours: 12**

Performance Assessments:

14.1 Class activity: Compare Plant infection to Human infection.
14.2 Lab activity: Analyze and diagnose plant problems and categorize them as diseases or viruses.
14.3 Class discussion: The environment and how infection is spread.
14.4 Explain the various types of innate and acquired immune responses.

Leadership Alignment:

The above performance assessments will embed instruction and assessment of an FFA presentation at a local or state Fair on infection and bacteria safety while attending a public event where food and animals have close proximity. 21st Century Skills used: Think Creatively, work creatively with others, reason effectively, use systems thinking, make judgments and decisions, solve problems, communicate clearly, collaborate with others, access and /evaluate Information, use and manage information, apply technology effectively, adapt to change, be flexible, manage goals and time, work independently, interact effectively with others, manage projects, produce results, guide and lead others.
Other activities could be but not limited to are, grade school presentations, and public information media announcement of safety posters used in a public event. 21st Century Skills: Think Creatively, work creatively with others, use systems thinking, make judgments and decisions, solve problems, communicate clearly, collaborate with others, access and /evaluate information, use and manage information, analyze media, create media products, apply technology effectively, adapt to change, be flexible, manage goals and time, work independently, interact effectively with others, work effectively in diverse teams, guide and lead others, and be responsible to others to deliver a quality project or presentation.

Standards and Competencies

Students will be able to:
6.1 Describe how infections are transmitted and what causes the symptoms of diseases
6.2 You will explain the various types of innate and acquired immune responses
6.3 Compare antibody and cellular immunity
6.4 Choose the best solution for a plant problem, create a model or drawing of the final control method and devise a way to test it.
6.6 Give a basic description of a plant virus.
6.7 Identify the factors that affect the spread of diseases
6.8 Explain how plants can prevent infection
6.9 Define/describe vector.
6.10 Identify the symptoms of an infected specimen.
6.11 Give a basic description of the reservoir for pathogens
6.12 Compare and contrast virus and diseases.
6.13 Analyze a societal issue that may be addressed through science and or technology to make educated public decisions.
BS.01.02. Performance Indicator: Determine regulatory issues and identify

agencies associated with biotechnology.
Science: A1
Language Arts: 4 and 7
Social Studies: 10c
BS.01.02.01.a. Describe the role of agencies that regulate biotechnology.
BS.01.02.01.b. Interpret the major regulatory issues related to biotechnology.
BS.01.02.01.c. Research, evaluate and articulate a major regulatory issue pertaining to biotechnology.
BS.01.03. Performance Indicator: Analyze the ethical, legal, social and cultural issues relating to biotechnology.
Science: A4
Language Arts: 4, 7 and 8
Social Studies: 10c and 10i
BS.01.03.01.a. Explore ethical, legal and social biotechnology issues.
BS.01.03.01.b. Evaluate the benefits and risks associated with biotechnology.
BS.01.03.01.c. Research, evaluate and articulate the implications of an ethical, legal, social or cultural biotechnology issue.

Aligned Washington State Standards

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Language

CC: College and Career Readiness Anchor Standards for Language

Conventions of Standard English

1 - Demonstrate command of the conventions of standard English grammar and usage when writing or speaking.

Vocabulary Acquisition and Use

4- Determine or clarify the meaning of unknown and multiple-meaning words and phrases by using context clues, analyzing meaningful word parts, and consulting general and specialized reference materials, as appropriate.

Mathematics

CC: Mathematical Practices (MP)

1 - Make sense of problems and persevere in solving them.

2 - Reason abstractly and quantitatively.

Reading

CC: Reading for Literacy in Science and Technical Subjects

Key Ideas and Details (9-10)

2 - Determine the central ideas or conclusions of a text; trace the text's explanation or depiction of a complex process, phenomenon, or concept; Provide an accurate summary of the text.

Craft and Structure (9-10)

3- Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or Technical context relevant to grades 9–10 texts and topics.

Science

LS1F All of the functions of the cell are based on chemical reactions. Food molecules are broken down to provide the energy and the chemical constituents needed to synthesize other molecules. Breakdown and synthesis are made possible by proteins called enzymes. Some of these enzymes enable the cell to store energy in special chemicals, such as ATP, that are needed to drive the many other chemical reactions in a cell.

LS3-1 Ask questions to clarify relationships about the role of DNA and chromosomes in coding the instructions for characteristic traits passed From parents to offspring.

LS3-2 Make and defend a claim based on evidence that inheritable genetic variations may result from: (1) new genetic combinations through meiosis, (2) viable errors occurring during replication, and/or (3) mutations caused by environmental factors. LS3-3. Apply concepts of statistics and probability to explain the variation and distribution of expressed traits in a population.

NOTE: INQ, SYS, APP standards are assessed depending on the type of assessment format: Inquiry Scenario, Systems Scenario, Field Study, or Technological Design.

Writing

CC: College and Career Readiness Anchor Standards for Writing

Text Types and Purposes

2 - Write informative/explanatory texts to examine and convey complex ideas and information clearly and accurately through the effective selection, organization, and analysis of content.

3- Write narratives to develop real or imagined experiences or events using effective technique, well-chosen details, and well-structured event Sequences.

Production and Distribution of Writing

4 - Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.

5 - Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach.

10 -Write routinely over extended time frames (time for research, reflection, and revision) and shorter time frames (a single sitting or a day or two) for a range of tasks, purposes, and audiences.

21st Century Skills
Check those that students will demonstrate in this course:

LEARNING & INNOVATION	**INFORMATION, MEDIA & TECHNOLOGY SKILLS**	**LIFE & CAREER SKILLS**
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