

*Wyoming*

Environmental and  
Natural Resources  
Handbook

2017-2021

## Purpose

*Environmental and natural resource education has a responsibility to educate the public and prepare students to enter careers in the environmental and natural resource industry. The purpose of the environmental and natural resource career development event is to foster student interest, promote environmental and natural resource instruction in the agricultural education curriculum and provide recognition for those who have demonstrated skills and competencies as a result of environmental and natural resource instruction.*

## Event Rules

- Each team will be comprised of four members. All four scores will be used to determine the total team score.
- Participants must come to the event prepared to work in adverse weather conditions. The event will be conducted regardless of the weather. Participants should have rainwear, warm clothes and appropriate footwear.
- Under no circumstance will any participant be allowed to handle any of the items in the identification portion of the practicums. Any infraction of this rule will be sufficient to eliminate a team from the event.
- Participants will be assigned to group leaders who will escort them to various event-staging sites. Each participant is to stay with his or her assigned group leader throughout the event or until told to change leaders by the event superintendent.
- All participants will be given an identification number by which they will be designated throughout the event.
- All written material will be furnished for the event. No written materials such as tests, problems and worksheets shall be removed from the site.
- No team, team member or team coach shall visit the event facilities to observe plant materials and facilities after Sept. 1. Any team, team member or coach reported and proven to do so will cause the elimination of the team from the Wyoming FFA Environmental and Natural Resource CDE.

## Event Format

### EQUIPMENT

Equipment that students must provide:

Each participant may bring a clipboard, 2 number 2 pencils and an electronic calculator. Calculators used in this event should be battery operated, non-programmable, silent with large keys and large displays. Calculators should have only these functions- addition, subtraction, multiplication, division, equals, percent, square root, +/- key, and one memory register. No other calculators are allowed to be used during the event. Students may use their own GPS units, but there will be units provided as well.

**Equipment provided-** All other tools and equipment will be furnished for the event. Participants must use the tools and equipment furnished at the event.

## TEAM ACTIVITY

### 400 POINTS TOTAL, 90 MINUTES

A yearly topic will be announced in the team orientation packet. Students will be provided a scenario that deals with an environmental/natural resource problem from the following areas:

#### Soils

- Physical properties
- Soil erosion
- Soil analysis
- Soil sustainability

#### Water

- Importance of water
- Factors that influence the quality and quantity of water
- Management practices to ensure water quality and quantity

#### Ecosystems

- Basic ecological concepts
- Management of ecosystems

#### Waste management

- Preventing and reducing solid waste
- Disposing of waste
- Manure management
- Hazardous waste

Teams will be required to develop both an oral, as well as a written statement that addresses the questions in the annual scenario.

The teamwork process will be assessed during the preparation portion. (150 points)

Teams will submit a written statement of their findings at the end of one hour. (150 points)

Teams will be required to give an oral presentation justifying the decisions made by the team and answer questions. The team will have eight minutes to make the oral presentation. (100 points)

## INDIVIDUAL ACTIVITIES

### OBJECTIVE WRITTEN EXAM — 60 MINUTES (100 POINTS)

The written exam will consist of fifty questions submitted by the event committee.

### PRACTICUMS

#### Identification (100 points)

Students will identify fifty items these may be pelts, bone, actual specimens, photos, footprint casts, scat from the following combined areas:

- Equipment list
- Native species list
- Invasive/non-native species list

#### Rotational Practicums (students will participate in one of the following practicums each year) 50 points

##### Water Analysis (50 points)

- Using measuring devices, each participant will measure a sample of water for quality analysis. Four of the following categories will be tested each year: dissolved oxygen, nitrates, nitrites, pH, temperature, phosphates, water hardness, chlorine and ammonia.
- Analyze the results of measurements and determine if it is suitable for a specific use.
- Answer questions using the data collected about water quality and limiting factors.

##### Soil Profile (50 points)

- Students will be furnished with a scorecard, an interpretation guide and a pre-dug soil pit or core/monolith to judge. The participants will identify soil horizons, textures, percentage coarse

fragments, pH, horizon colors, slope, geologic origin, soil permeability, irrigation suitability and soil structure types of the soil present in the given example.

- Using the information from the scorecard and interpretation guide, the student will then identify the most appropriate use for the given area and the erosion control practice that best fits the designated use for the land.

### **GPS Locations (50 points)**

Participants will utilize the global position system (GPS) unit (supplied by the team) to complete one of the following:

- Identify the longitude and latitude of a given set of points using a GPS unit and a map.
- Identify boundaries of a given area including calculation of land area and linear feet of boundary.
- Use GPS unit and topographic map to layout the location of fence line, pond, drainage structure or other related facility.
- Use a GPS unit to mark the location of a path or road through a given area.
- Use GPS unit to determine slope of land area for installation of drainage and or other related facilities.

### **Environmental Analysis (50 points)**

Areas that could be analyzed are as follows: forests, grasslands, wetlands, farm land and rangelands. Any of these areas could be bordered by industry, urban development, recreational areas, etc.

Students will address the following five aspects:

- **Living organisms:** students will identify and list as many living organisms (both native and invader) as they can find within the marked boundaries of the site. Additional species may be artificially introduced as mounted or preserved specimens.
- **Non-living components (shelter, nutrients):** students will inventory resources such as water, shelter, etc. upon which resident species depend for survival.
- **Food web:** students will define relationships among the plants and animal species that are found or introduced in the study area.
- **Ecological succession:** students will identify the stages of succession of various grasses, shrubs and trees. They will also identify causes of changes in succession patterns.
- **Situation analysis:** students will determine whether a healthy balance exists between the environment and the species that depend upon it. They will also check remediation practices where needed.

## Scoring

| ACTIVITY             | Individual Points | Total Team Points |
|----------------------|-------------------|-------------------|
| Written Exam         | 100               | 400               |
|                      |                   |                   |
| Identification       | 100               | 400               |
| Rotational Practicum | 50                | 200               |
|                      |                   |                   |
|                      |                   |                   |
|                      |                   |                   |
| Team Activity        |                   | 400               |
| <b>TOTAL POINTS</b>  | <b>250</b>        | <b>1400</b>       |

## TIEBREAKER

### TEAM

- Highest team activity score
- Highest practicum scores
- Highest combined identification score

### INDIVIDUAL

- Highest exam score
- Highest practicum scores
- Highest identification score

## Awards

*Awards will be presented to individuals and/or teams based upon their rankings at State FFA Convention.*

## References

*This list of references is not intended to be all-inclusive.*

Other sources may be utilized, and teachers are encouraged to make use of the very best instructional materials available. The following list contains references that may prove helpful during event preparation.

- For past materials and preparation documents log onto [FFA.org](http://FFA.org)
- Managing Our Natural Resources. Camp and Daughtery. Delmar Publishers, Inc. 2009. Albany NY.
- Land Judging in Oklahoma. J.H. Stiegler, 4-H Member's Guide, Oklahoma Cooperative Extension Service, Division of Agricultural Sciences and Natural Resources, Oklahoma State University. 4H.HPS.101
- Environmental Science: Fundamentals and Applications. Cengage learning. 2007
- Applied Environmental Science: <https://www.FFA.org/thecouncil/resources>

# Identification List

100 points

## EQUIPMENT

### WATER QUALITY

- 101. refractometer
- 102. secchi disk
- 103. water meter for physical/chemical parameters (pH, conductivity and/or DO)

### AQUATIC

- 104. bottom dredges
- 105. fish measuring board
- 106. plankton net
- 107. seines
- 108. sieves

### WILDLIFE

- 109. animal tags/bands
- 110. mammal traps
- 111. snake/reptile stick
- 112. radio telemetry unit

## NATIVE SPECIES

### WILDLIFE

- |                     |                    |                     |
|---------------------|--------------------|---------------------|
| 201. armadillo      | 213. fox squirrel  | 225. pocket gopher  |
| 202. badger         | 214. gray squirrel | 226. porcupine      |
| 203. beaver         | 215. gray wolf     | 227. prairie dog    |
| 204. bighorn sheep  | 216. grizzly bear  | 228. pronghorn      |
| 205. bison          | 217. jack rabbit   | 229. raccoon        |
| 206. black bear     | 218. mole          | 230. red fox        |
| 207. blacktail deer | 219. moose         | 231. skunk          |
| 208. bobcat         | 220. mountain goat | 232. weasel         |
| 209. chipmunk       | 221. mountain lion | 233. whitetail deer |
| 210. cottontail     | 222. mule deer     | 234. woodchuck      |
| 211. coyote         | 223. muskrat       |                     |
| 212. elk            | 224. opossum       |                     |

### WEATHER

- 113. wind speed meters
- 114. barometer

### SOILS

- 115. abny level
- 116. push probe
- 117. soil auger
- 118. soil color book



**BIRDS**

- |                       |                       |                       |
|-----------------------|-----------------------|-----------------------|
| 301. bald eagle       | 310. mourning dove    | 319. pelican          |
| 302. blue jay         | 311. great blue heron | 320. purple martin    |
| 303. bluebird         | 312. great horned owl | 321. quail            |
| 304. brown thrasher   | 313. golden eagle     | 322. red-tailed hawk  |
| 305. Canada goose     | 314. hummingbird      | 323. sand hill crane  |
| 306. canvasback duck  | 315. kestrel          | 324. blue-winged teal |
| 307. cardinal         | 316. least tern       | 325. turkey           |
| 308. Cooper’s hawk    | 317. mallard duck     | 326. whooping crane   |
| 309. Crissal thrasher | 318. osprey           | 327. wood duck        |

**REPTILES/AMPHIBIANS**

- |                                |                         |                         |
|--------------------------------|-------------------------|-------------------------|
| 401. alligator                 | 408. coral snake        | 415. gray tree frog     |
| 402. alligator snapping turtle | 409. corn snake         | 416. rattlesnake        |
| 403. black rat snake           | 410. cottonmouth        | 417. red eared slider   |
| 404. bullfrog                  | 411. crocodile          | 418. ring neck snake    |
| 405. collared lizard           | 412. fence lizard       | 419. rubber boa snake   |
| 406. common snapping turtle    | 413. garter snake       | 420. scarlet king snake |
| 407. copperhead snake          | 414. green anole lizard | 421. Woodhouse’s toad   |

**FISH AND OTHER AQUATIC ANIMALS**

- |                      |                       |                              |
|----------------------|-----------------------|------------------------------|
| 501. blue catfish    | 508. crappie          | 515. smallmouth bass         |
| 502. bream/bluegill  | 509. crayfish         | 516. sturgeon                |
| 503. brown trout     | 510. flathead catfish | 517. trout                   |
| 504. carp            | 511. largemouth bass  | 518. walleye                 |
| 505. channel catfish | 512. lobster          | 519. yellow bullhead catfish |
| 506. clam            | 513. salmon           |                              |
| 507. crab            | 514. shrimp           |                              |

## INVASIVE/NON-NATIVE SPECIES

### PLANTS

601. broom snake weed  
 602. cheatgrass  
 603. Chinese tallow  
 604. cogongrass  
 605. English ivy

606. Himalaya blackberry  
 607. hydrilla  
 608. juniper  
 609. kudzu  
 610. leafy spurge

611. melaleuca  
 612. mimosa tree  
 613. purple loosestrife  
 614. Russian olive  
 615. saltcedar

### ANIMALS

701. Asiatic clam  
 702. Asian long-horned beetle  
 705. Chinese mitten crab  
 706. chukkar  
 707. English sparrow  
 708. European starling

709. feral hog  
 710. feral horse  
 711. fire ant  
 712. gopher  
 713. Norway rat  
 714. nutria

715. ring neck pheasant  
 716. sea lamprey  
 717. tilapia  
 718. zebra mussel

## Team Activity – Team Presentation

400 points

| CHAPTER                      |  | STATE   |   | TEAM NUMBER |              |
|------------------------------|--|---|---|-------------|--------------|
| INDICATOR                    | Very strong evidence of skill is present<br>5–4 points   | Moderate evidence of skill is present<br>3–2 points   | Strong evidence of skill is not present<br>1–0 points   | Weight      | Total Points |
| <b>Written statement</b>     |  |   |   |             |              |
| <b>Writing conventions</b>   | Information is thoroughly and clearly reported. Ideas are clearly addressed and supported with details. There is a concise informative organization to the writing. Grammar and spelling are high quality. Less than two blatant errors. | Ideas are stated with some supporting details. There is some organization evident without clear construction. (Intro, body and conclusion). Grammar and spelling are adequate. There are less than five blatant errors. | The message is difficult to understand. The main idea of the presentation is not supported by details. Rambling message with obvious lack of organization. Lack of grammar and correct spelling throughout the writing. There are six or more blatant errors. | X 40        |              |
| <b>Analysis</b>              | Addresses the problem at hand and conveys viable solutions. Subject knowledge excellent.   | Addresses the problem at hand solutions may not be as clear or viable. Subject knowledge is average   | No specific focus on the problem. Factual errors are evident.   | X 40        |              |
| <b>Presentation</b>          |  |   |   |             |              |
| <b>Communication</b>         | Speaks very articulately without hesitation. Confidence, poise and eye contact; excellent use of grammar. Oral communication enhances entire presentation. Never has the need for unnecessary pauses or hesitation when speaking.        | Speaks articulately but sometimes hesitates. Some problems with eye contact and grammar is average. Occasionally has the need for a long pause or moderate hesitation when speaking.                                    | Speaks articulately but frequently hesitates. Frequently hesitates or has long, awkward pauses while speaking. Reads from notes and rarely looks at the judges. Has problem with pronunciation and/or very low level use of grammar.                          | X 40        |              |
| <b>Participation</b>         | All members participated equally.  | The majority of the group took an active role.  | All members did not participate equally, obvious weak individuals   | X 20        |              |
| <b>Questions and Answers</b> | Knowledge is evident and provides a clear, concise well-thought out answer to the questions.   | Provides answers that are somewhat unclear and at times does not answer the questions.  | Seems caught off guard by questions and either does not answer the question or provides a rambling answer   | X 20        |              |
| <b>TOTAL POINTS</b>          |  |   |   |             |              |

| <b>INDICATOR</b>  | <b>Very strong evidence of skill is present<br/>5-4 points</b>  | <b>Moderate evidence of skill is present<br/>3-2 points</b>   | <b>Strong evidence of skill is not present<br/>1-0 points</b>   | <b>Points Earned</b> | <b>Weight</b> | <b>Total Points</b> |
|---|---|---|---|----------------------|---------------|---------------------|
| <b>Teamwork</b>   |   |   |   |                      |               |                     |
| <b>Managing team dynamics</b>                           | Completely committed to team dynamics, maturity and professionalism is always present.<br>In team conflicts, problem-solving and decision-making methods and skills are used to produce a positive compromise.            | Somewhat committed to team dynamics, maturity and professionalism is seldom present.<br>In team conflicts, problem-solving and decision-making methods and skills are sometimes used to produce a compromise. Sometimes involvement in this process is limited. | Lacking team dynamics, maturity and professionalism.<br>When team conflict arises minimal or no attempt at a resolution is made by team members.  |                      | X 6           |                     |
| <b>Awareness of personality styles of others</b>        | Totally conscious and respectful of differing attitudes, personalities and behaviors.<br>Language is free of bias, and completely shows an understanding and respect for others' differences in learning and personality. | Is, for the most part, respectful of others' differences in personality and behavior.<br>For the most part, language conveys an understanding of others' differences in learning and personality.   | Shows little tolerance for differing personalities and behaviors.<br>Language used may be expressed as not understanding others' differences in personality and learning styles.                                      |                      | X 2           |                     |
| <b>Uses positive and mature language and mannerisms</b> | Always uses mature language and mannerisms.<br>Never uses immature verbal and/or nonverbal communication.<br>Always has positive communications.  | Usually uses mature language and mannerisms.<br>Rarely uses immature verbal and/or nonverbal communication.<br>Usually has positive communications.   | Seldom or never uses mature language and mannerisms.<br>Frequently uses immature verbal and/or nonverbal communication.<br>Seldom has positive communications.  |                      | X 4           |                     |
| <b>Reacting to changes</b>                              | Has ability to react and transition effortlessly to change.<br>Shows excellent ability to adapt with unexpected change; thinks quickly; shows no sign of stress.  | Typically reacts well to changes.<br>Seems able to adapt to unexpected change most of the time; occasionally stresses.  | Has difficulty reacting well to changes.<br>Seems stressed by change.   |                      | X 2           |                     |
| <b>Handling tasks</b>                                   | Handles tasks with ease, including task assignment.<br>Efficient in planning, managing and completing all tasks in a timely and organized fashion.<br>All project parts are assigned equally.                             | Does a good job handling tasks with some ease, including task assignment.<br>Is thoughtful about the planning and sequencing of tasks, but occasional priority mistakes are made.<br>Some project parts are assigned equally.                                   | Has difficulty handling tasks, including task assignment.<br>Seems to have trouble deciding the order to do several tasks and struggles with completion in a timely manner.<br>No project parts are assigned equally. |                      | X 6           |                     |
| <b>TOTAL POINTS</b>                                     |   |   |   |                      |               |                     |

# Water Analysis Scorecard

100 points

NAME

MEMBER NUMBER

CHAPTER

STATE

Your job today is to analyze the given water sample. You will need to find the given levels of the following possible factors: nitrites, dissolved oxygen, nitrates, pH, phosphates, water hardness, chlorine, ammonia and the current temperature. Using this information indicate if the water quality is suitable for the given species. Indicate the limiting factors and explain ways this water quality can be improved. (Each year, you will test for four of the categories listed above.)

| CATEGORY   | Answers | Possible Points | Total Points |
|--|---------|-----------------|--------------|
| 1  |         | 10              |              |
| 2  |         | 10              |              |
| 3  |         | 10              |              |
| 4  |         | 10              |              |
| Indicate if the quality of the sample is suitable for the following use: |         | 10              |              |
| Indicate the limiting factor(s):   |         | 25              |              |
| How can water quality be improved?                                       |         | 25              |              |
| <b>TOTAL:</b>  |         | <b>100</b>      |              |

# Soil Profile Scorecard

100 points

NAME

MEMBER NUMBER

CHAPTER

STATE

**PART 1 (60 POINTS)**

| Soil Factors – Part 1 (Check Appropriate Box) |   | Soil Factors – Part 1 (Check Appropriate Box) |  |
|---|---|---|--|
| Points  |   | Points  |  |
|   | <p><b>Texture</b><br/>Sur. Sub.</p> <p><input type="checkbox"/> <input type="checkbox"/> 1. Coarse</p> <p><input type="checkbox"/> <input type="checkbox"/> 2. Moderately Coarse</p> <p><input type="checkbox"/> <input type="checkbox"/> 3. Medium</p> <p><input type="checkbox"/> <input type="checkbox"/> 4. Moderately Fine</p> <p><input type="checkbox"/> <input type="checkbox"/> 5. Fine</p> <p><b>Depth of Soil</b></p> <p><input type="checkbox"/> 1. Deep</p> <p><input type="checkbox"/> 2. Moderately Deep</p> <p><input type="checkbox"/> 3. Shallow</p> <p><input type="checkbox"/> 4. Very Shallow</p> <p><b>Slope</b></p> <p><input type="checkbox"/> 1. Nearly Level ..... 0-1%</p> <p><input type="checkbox"/> 2. Gently Sloping ..... 1-3%</p> <p><input type="checkbox"/> 3. Moderate Sloping..... 3-5%</p> <p><input type="checkbox"/> 4. Strongly Sloping..... 5-8%</p> <p><input type="checkbox"/> 5. Steep ..... 8-15%</p> <p><input type="checkbox"/> 6. Very Steep ..... &gt; 15%</p> <p><b>Erosion – Wind and Water</b></p> <p><input type="checkbox"/> 1. None to Slight</p> <p><input type="checkbox"/> 2. Moderate</p> <p><input type="checkbox"/> 3. Severe</p> <p><input type="checkbox"/> . Very Severe</p> |   | <p><b>Permeability</b></p> <p><input type="checkbox"/> 1. Rapid</p> <p><input type="checkbox"/> 2. Moderate</p> <p><input type="checkbox"/> 3. Slow</p> <p><input type="checkbox"/> 4. Very Slow</p> <p><b>Surface Runoff</b></p> <p><input type="checkbox"/> 1. Rapid</p> <p><input type="checkbox"/> 2. Moderate</p> <p><input type="checkbox"/> 3. Slow</p> <p><input type="checkbox"/> 4. Very Slow</p> <p><b>Major Factors That Keep Area Out of Class 1</b></p> <p><input type="checkbox"/> 1. Texture</p> <p><input type="checkbox"/> 2. Depth</p> <p><input type="checkbox"/> 3. Slope</p> <p><input type="checkbox"/> 4. Erosion</p> <p><input type="checkbox"/> 5. Permeability</p> <p><input type="checkbox"/> 6. Runoff</p> <p><input type="checkbox"/> 7. Wetness</p> <p><input type="checkbox"/> 8. Flooding</p> <p><input type="checkbox"/> 9. None</p> <p><b>Land Capability Class</b></p> <p><input type="checkbox"/> 1. Class I</p> <p><input type="checkbox"/> 2. Class II</p> <p><input type="checkbox"/> 3. Class III</p> <p><input type="checkbox"/> 4. Class IV</p> <p><input type="checkbox"/> 5. Class V</p> <p><input type="checkbox"/> 6. Class VI</p> <p><input type="checkbox"/> 7. Class VII</p> <p><input type="checkbox"/> 8. Class VIII</p> |
|   | <b>Points</b>   |   | <b>Points</b>  |

**TOTAL POINTS PART 1**

# Soil Profile Scorecard

| PART 2 (40 POINTS)                                     |   |
|--|---|
| Recommended Treatment – Part 1 (Check Appropriate Box) |   |
| Points   |   |
|  | <p><b>Vegetative</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> 1. Row crop/occasional soil conserving crop</li> <li><input type="checkbox"/> 2. Row crop/frequent soil conserving crop</li> <li><input type="checkbox"/> 3. Row crops not more than 2 out of 4 years</li> <li><input type="checkbox"/> 4. Row crops not more than 1 out of 5 years</li> <li><input type="checkbox"/> 5. Return crop residue to the soil</li> <li><input type="checkbox"/> 6. Practice conservation tillage</li> <li><input type="checkbox"/> 7. Establish recommended grass or grasses and legumes</li> <li><input type="checkbox"/> 8. Proper pasture and range management</li> <li><input type="checkbox"/> 9. Protect from burning</li> <li><input type="checkbox"/> 10. Control grazing</li> <li><input type="checkbox"/> 11. Plant recommended trees</li> <li><input type="checkbox"/> 12. Harvest trees selectively</li> <li><input type="checkbox"/> 13. Use only for wildlife or recreation area</li> </ul> <p><b>Mechanical</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> 14. Control brush or trees</li> <li><input type="checkbox"/> 15. Terrace and farm on contour</li> <li><input type="checkbox"/> 16. Maintain terraces</li> <li><input type="checkbox"/> 17. Construction diversion terraces</li> <li><input type="checkbox"/> 18. Install drainage system</li> <li><input type="checkbox"/> 19. Control gullies</li> <li><input type="checkbox"/> 20. No mechanical treatment needed</li> </ul> <p><b>Fertilizer and Soil Amendments</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> 21. Soil amendments</li> <li><input type="checkbox"/> 22. Phosphorous [P]</li> <li><input type="checkbox"/> 23. Potassium [K]</li> <li><input type="checkbox"/> 24. Nitrogen [N]</li> <li><input type="checkbox"/> 25. Fertilizer or soil amendments not needed</li> </ul> |
|  | <b>TOTAL POINTS PART 2 (40 POINTS POSSIBLE)</b>   |
|  | <b>TOTAL POINTS PART 1(60 POINTS POSSIBLE)</b>  |
|  | <b>GRAND TOTAL POINTS – 100 (POINTS POSSIBLE)</b>   |

JUDGE'S NAME

JUDGE'S SIGNATURE

DATE

# GPS Location Scorecard

100 points

---

|         |               |
|---------|---------------|
| NAME    | MEMBER NUMBER |
| CHAPTER | STATE         |
|         | TEAM NUMBER   |

List your numbers for each location point following the latitude and longitude given.

**Note:** Variance for differential corrections are noted on condition sheet.

| Location Point      | Point Number | Possible Points | Points Earned |
|---------------------|--------------|-----------------|---------------|
| 1                   |              | 20              |               |
| 2                   |              | 20              |               |
| 3                   |              | 20              |               |
| 4                   |              | 20              |               |
| 5                   |              | 20              |               |
| <b>TOTAL POINTS</b> |              |                 |               |

---

|              |                   |      |
|--------------|-------------------|------|
| JUDGE'S NAME | JUDGE'S SIGNATURE | DATE |
|--------------|-------------------|------|



# Agriculture, Food and Natural Resources Content Standards

## AS.01.01. Performance Indicator: Evaluate the development and implications of animal origin, domestication and distribution on production practices and the environment.

|   |  |          |
|---|--|----------|
| AS.01.01.01.c. Evaluate the implications of animal adaptations on production practices and the environment.   | Team Activity, Annual Practicum – Waste Management | HS-LS4-3 |
| AS.01.01.02.c. Predict trends and implications of future developments within different animal industries on production practices and the environment. | Team Activity, Annual Practicum – Waste Management | HS-LS4-3 |

## AS.01.02. Performance Indicator: Assess and select animal production methods for use in animal systems based upon their effectiveness and impacts.

|   |   |   |
|---|---|---|
| AS.01.02.01.b. Analyze the impact of animal production methods on end product qualities (e.g., price, sustainability, marketing, labeling, animal welfare, etc.). | Team Activity   | AFNR Career Cluster, Statement 1<br>AFNR Career Cluster – Animal Systems Pathway, Statement 3<br>STEM Career Cluster, Statement 1<br>Buying Goods and Services, Benchmarks: Grade 12, Statement 1<br>Buying Goods and Services, Benchmarks: Grade 12, Statement 3 |
| AS.01.02.04.b. Research and summarize local wildlife populations, challenges and ecological measures that are being utilized                                      | Team Activity, Data Analysis, Annual Practicums – Water, Soil, Waste Management | AFNR Career Cluster, Statement 1<br>AFNR Career Cluster – Animal Systems Pathway, Statement 3<br>STEM Career Cluster, Statement 1<br>Buying Goods and Services, Benchmarks: Grade 12, Statement 1<br>Buying Goods and Services, Benchmarks: Grade 12, Statement 3 |
| AS.01.02.04.c. Devise and evaluate plans to manage wildlife populations to achieve optimal ecological health.   | Team Activity, Annual Practicums – Water, Soil, Waste Management                | AFNR Career Cluster, Statement 1<br>AFNR Career Cluster – Animal Systems Pathway, Statement 3<br>STEM Career Cluster, Statement 1<br>Buying Goods and Services, Benchmarks: Grade 12, Statement 1<br>Buying Goods and Services, Benchmarks: Grade 12, Statement 3 |

## AS.01.03. Performance Indicator: Analyze and apply laws and sustainable practices to animal agriculture from a global perspective.

|  |   |  |
|--|---|--|
| AS.01.03.02.b. Analyze the local and global impact of sustainable animal agriculture practices on human and environmental systems. | Team Activity, Data Analysis, Annual Practicums – Water, Gps, Soil and Waste Management | AFNR Career Cluster, Statement 2<br>AFNR Career Cluster – Animal Systems Pathway, Statement 1<br>STEM Career Cluster, Statement 1, 4<br>CCSS.ELA-Literacy.W.9-10.9b CCSS.ELA-Literacy.W.11-12.9b<br>CCSS.ELA-Literacy.RI.9-10.1<br>CCSS.ELA-Literacy.RI.11-12.1<br>HS-ETS1-1 |
|--|---|--|

|   |  |  |
|---|--|--|
| AS.01.03.02.c. Select, evaluate and defend the use of sustainable practices in animal agriculture.  | Team Activity And Data Analysis  | AFNR Career Cluster, Statement 2<br>AFNR Career Cluster – Animal Systems Pathway, Statement 1<br>STEM Career Cluster, Statement 1, 4<br>CCSS.ELA-Literacy.W.9-10.9b CCSS.ELA-Literacy.W.11-12.9b<br>CCSS.ELA-Literacy.RI.9-10.1<br>CCSS.ELA-Literacy.RI.11-12.1<br>HS-ETS1-1 |
| <b>AS.08.01. Performance Indicator: Design and implement methods to reduce the effects of animal production on the environment.</b>   |  |  |
| AS.08.01.01.b. Assess methods of reducing the effects of animal agriculture on the environment.   | Written Exam, Team Activity – Water and Waste Management, Data Analysis – Soil and Gps | AFNR Career Cluster – Environmental Service Systems Pathway, Statement 1<br>HS-LS2-6<br>HS-LS2-7   |
| AS.08.01.01.c. Devise a plan that includes measures to reduce the impact of animal agriculture on the environment.  | Written Exam, Team Activity – Data Analysis – Soil and Gps                             | AFNR Career Cluster – Environmental Service Systems Pathway, Statement 1<br>HS-LS2-6<br>HS-LS2-7   |
| <b>AS.08.02. Performance Indicator: Evaluate the effects of environmental conditions on animals and create plans to ensure favorable environments for animals.</b>  |  |  |
| AS. 08.02.01.b. Critique the reliability and validity of evidence presented to support claims regarding the effects of environmental conditions on animal populations and performance (e.g., population changes, emerging species, extinction, etc.). | Written Exam, Team Activity – Water and Waste Management, Data Analysis – Soil and Gps | HS.LS4-6   |
| AS. 08.02.01.c. Apply valid and reliable research evidence to predict the potential effects of different environmental conditions for an animal population.   | Written Exam, Team Activity – Water and Waste Management, Data Analysis – Soil and Gps | HS.LS4-6   |
| AS.08.02.02.b. Implement and evaluate the effectiveness of methods to ensure optimal environmental conditions for animals.  | Written Exam, Team Activity – Water and Waste Management, Data Analysis – Soil and Gps | HS.LS4-6   |

|  |                                |   |
|--|--------------------------------|---|
| AS.08.02.02.c. Devise and improve plans to establish favorable environmental conditions for animal growth and performance based on a variety of factors (e.g., economic feasibility, environmental sustainability, impact on animals, etc.).                       | Data Analysis and Written Exam | HS.LS4-6  |
| <b>BS.01.01. Performance Indicator: Investigate and explain the relationship between past, current and emerging applications of biotechnology in agriculture (e.g., major innovators, historical developments, potential applications of biotechnology, etc.).</b> |                                |   |
| BS.01.01.03.b. Analyze and document emerging problems and issues associated with agricultural biotechnology.   | Team Activity                  | CCSS.ELA-Literacy.RI.9-10.1<br>CCSS.ELA-Literacy.RI.11-12.1<br>CCSS.ELA-Literacy.RI.9-10.6<br>CCSS.ELA-Literacy.RI.11-12.6<br>CCSS.ELA-Literacy.WI.9-10.2<br>CCSS.ELA-Literacy.WI.11-12.2 |
| BS.01.03.01.c. Devise and support an argument for or against an ethical issue associated with biotechnology in agriculture.  | Team Activity                  | CCSS.ELA-Literacy.RI.9-10.1<br>CCSS.ELA-Literacy.RI.11-12.1<br>CCSS.ELA-Literacy.RI.9-10.6<br>CCSS.ELA-Literacy.RI.11-12.6<br>CCSS.ELA-Literacy.WI.9-10.2<br>CCSS.ELA-Literacy.WI.11-12.2 |
| <b>BS.02.01. Performance Indicator: Read, document, evaluate and secure accurate laboratory records of experimental protocols, observations and results.</b>   |                                |   |
| BS.02.01.01.b. Maintain and interpret laboratory records documented in a laboratory to ensure data accuracy and integrity (e.g., avoid bias, record any conflicts of interest, avoid misinterpreted results, etc.).  | Data Interpretation            | CCSS.ELA-Literacy.RST.9-10.1<br>CCSS.ELA-Literacy.RST.11-12.1<br>CCSS.ELA-Literacy.RST.9-10.3<br>CCSS.ELA-Literacy.RST.11-12.3  |
| <b>BS.02.02. Performance Indicator: Implement standard operating procedures for the proper maintenance, use and sterilization of equipment in a laboratory.</b>  |                                |   |
| BS.02.02.02.b. Manipulate basic laboratory equipment and measurement devices (e.g., water bath, electrophoresis equipment, micropipettes, laminar flow hood, etc.).  | Water Management               |   |
| <b>BS.02.04. Performance Indicator: Safely manage and dispose of biological materials, chemicals and wastes according to standard operating procedures.</b>  |                                |   |

|  |                                    |   |
|--|------------------------------------|---|
| BS.02.04.01.b. Assess the need for personal protective equipment and select the appropriate equipment to wear when working with biological and chemical materials. | Water Management                   | CCSS.ELA-Literacy.RST.9-10.4<br>CCSS.ELA-Literacy.RST.11-12.4 |
| BS.02.04.03.c. Propose a management plan to reduce laboratory waste and prevent ecological or health problems related to waste disposal.                           | Team Activity and Waste Management | CCSS.ELA-Literacy.RST.9-10.4<br>CCSS.ELA-Literacy.RST.11-12.4 |

**BS.03.01. Performance Indicator: Apply biotechnology principles, techniques and processes to create transgenic species through genetic engineering.**

|  |                              |          |
|--|------------------------------|----------|
| BS.03.01.03.a. Analyze the benefits and risks associated with the use of biotechnology to increase productivity and improve quality of living species (e.g., plants, animals such as aquatic species, etc.). | Team Activity                | HS-LS3-2 |
| BS.03.01.04.b. Analyze data to identify changes and patterns of transgenic species in the environment.   | Team Activity, Data Analysis | HS-LS3-2 |

**BS.03.03. Performance Indicator: Apply biotechnology principles, techniques and processes to protect the environment and maximize use of natural resources (e.g., biomass, bioprospecting, industrial biotechnology, etc.).**

|   |               |  |
|---|---------------|--|
| BS.03.03.01.b. Analyze how biotechnology can be used to monitor the effects of agricultural practices on natural populations. | Team Activity |  |
| BS.03.03.01.c. Evaluate the impact of modified organisms on the natural environment.  | Team Activity |  |
| BS.03.03.03.b. Assess and document the pros and cons of bioprospecting.   | Team Activity |  |
| BS.03.03.03.c. Weigh the short-term and long-term impacts of bioprospecting on the environment.                               | Team Activity |  |

**BS.03.04. Performance Indicator: Apply biotechnology principles, techniques and processes to enhance plant and animal care and production (e.g., selective breeding, pharmaceuticals, biodiversity, etc.).**

|  |                                 |  |
|--|---------------------------------|--|
| BS.03.04.02.b. Assess the benefits, risks and opportunities associated with using biotechnology to promote animal health.  | Team Activity                   | HS-ETS1-2<br>HS-LS4-6  |
| BS.03.04.04.b. Assess whether current threats to biodiversity will have an unsustainable impact on human populations.  | Team Activity                   | HS-ETS1-2<br>HS-LS4-6  |
| <b>BS.03.05. Performance Indicator: Apply biotechnology principles, techniques and processes to produce biofuels (e.g., fermentation, transesterification, methanogenesis, etc.).</b>      |                                 |  |
| BS.03.05.01.b. Analyze the impact of the production and use of biofuels on the environment.  | Team Activity                   | AFNR Career Cluster, Statement 5<br>CCSS.ELA-Literacy.RI.9-10.1<br>CCSS.ELA-Literacy.RI.11-12.1<br>CCSS.ELA-Literacy.RST.9-10.3<br>CCSS.ELA-Literacy.RST.11-12.3 |
| BS.03.05.01.c. Evaluate and support how biofuels could solve a global issue (e.g., environmental, agricultural, etc.).   | Team Activity                   | AFNR Career Cluster, Statement 5<br>CCSS.ELA-Literacy.RI.9-10.1<br>CCSS.ELA-Literacy.RI.11-12.1<br>CCSS.ELA-Literacy.RST.9-10.3<br>CCSS.ELA-Literacy.RST.11-12.3 |
| BS.03.05.05.b. Analyze and describe the process used to produce methane from biomass.  | Team Activity, Waste Management | AFNR Career Cluster, Statement 5<br>CCSS.ELA-Literacy.RI.9-10.1<br>CCSS.ELA-Literacy.RI.11-12.1<br>CCSS.ELA-Literacy.RST.9-10.3<br>CCSS.ELA-Literacy.RST.11-12.3 |
| <b>BS.03.06. Performance Indicator: Apply biotechnology principles, techniques and processes to improve waste management (e.g., genetically modified organisms, bioremediation, etc.).</b> |                                 |  |
| BS.03.06.01.b. Analyze the process by which organisms are genetically engineered for waste treatment.  | Team Activity, Waste Management |  |
| BS.03.06.02.b. Assess and describe the processes involved in biotreatment of biological wastes.  | Team Activity, Waste Management |  |
| BS.03.06.03.b. Evaluate and describe the processes involved in biotreatment of industrial chemical wastes.   | Team Activity, Waste Management |  |
| BS.03.06.04.b. Analyze and summarize the risks and benefits of using biotechnology for bioremediation.   | Team Activity, Waste Management |  |

**CS.01.01. Performance Indicator: Examine issues and trends that impact AFNR systems on local, state, national and global levels. Team Activity**

|   |               |  |
|---|---------------|--|
| CS.01.01.01.b. Analyze and document AFNR issues and their impact on local, state, national and global levels.               | Team Activity |  |
| CS.01.01.02.b. Analyze current trends in AFNR systems and predict their impact on local, state, national and global levels. | Team Activity |  |
| CS.01.01.02.c. Evaluate emerging trends and the opportunities they may create within the AFNR systems.                      | Team Activity |  |

**CS.01.02. Performance Indicator: Examine technologies and analyze their impact on AFNR systems. Team Activity**

|  |               |  |
|--|---------------|--|
| CS.01.02.01.b. Apply appropriate use of technologies in AFNR workplace scenarios.                          | Team Activity |  |
| CS.01.02.01.c. Solve problems in AFNR workplaces or scenarios using technology.                            | Team Activity |  |
| CS.01.02.02.b. Analyze how technology is used in AFNR systems to maximize productivity.<br>Team Activity   |               |  |
| CS.01.02.02.c. Evaluate the importance of technology use and how it impacts AFNR systems.<br>Team Activity |               |  |

**CS.02.01. Performance Indicator: Research geographic and economic data related to AFNR systems.**

|   |  |  |
|---|--|--|
| CS.02.01.01.b. Assess sets of AFNR geographic data using systems and technologies (e.g., GIS, GPS, etc.).     | Gps, Waste Management, Soil Management |  |
| CS.02.01.01.c. Evaluate geographic data and select necessary data sets to solve problems within AFNR systems. | Gps, Waste Management, Soil Management |  |

**CS.02.02. Performance Indicator: Examine the components of the AFNR systems and their impact on the local, state, national and global society and economy.**

|   |               |  |
|---|---------------|--|
| CS.02.02.01.b. Assess components within AFNR systems and analyze relationships between systems.   | Team Activity |  |
| CS.02.02.01.c. Devise a strategy for explaining components of AFNR systems to audiences with limited knowledge.   | Team Activity |  |
| CS.02.02.02.b. Assess how people within societies on local, state, national and global levels interact with AFNR systems on daily, monthly or yearly basis. | Team Activity |  |
| CS.02.02.03.b. Assess the economic impact of an AFNR system on a local, state, national and global level. Team Activity                                     |               |  |
| CS.02.02.03.c. Evaluate how positive or negative changes in the local, state, national or global economy impacts AFNR systems.                              | Team Activity |  |

**CS.03.01. Performance Indicator: Identify required regulations to maintain and improve safety, health and environmental management systems.**

|  |                              |  |
|--|------------------------------|--|
| CS.03.01.02.b. Analyze existing required regulations within an AFNR workplace. | Team Activity, Data Analysis |  |
|--|------------------------------|--|

**CS.03.02. Performance Indicator: Develop a plan to maintain and improve health, safety and environmental compliance and performance.**

|  |               |                                  |
|--|---------------|----------------------------------|
| CS.03.02.01.c. Create a plan to improve safety, health and environmental management regulations in an AFNR business.   | Team Activity | AFNR Career Cluster, Statement 6 |
| CS.03.02.02.b. Develop plans to improve environmental compliance and performance within an AFNR system.                | Team Activity | AFNR Career Cluster, Statement 6 |
| CS.03.02.02.c. Devise a strategy to educate employees on environmental compliance and performance in an AFNR business. | Team Activity | AFNR Career Cluster, Statement 6 |

**CS.04.01. Performance Indicator: Identify and implement practices to steward natural resources in different AFNR systems.**

|   |  |  |
|---|--|--|
| CS.04.01.01.b. Analyze available practices to steward natural resources in AFNR systems (e.g., wildlife and land conservation, soil and water practices, ecosystem management, etc.). | Team Activity, Data Analysis, Written Exam | AFNR Career Cluster, Statement 2<br>AFNR Career Cluster, Statement 3 |
| CS.04.01.01.c. Devise strategies for stewarding natural resources at home and within community.   | Team Activity, Data Analysis, Written Exam | AFNR Career Cluster, Statement 2<br>AFNR Career Cluster, Statement 3 |
| CS.04.01.02.b. Analyze and assess sustainability practices that can be applied in AFNR systems (e.g., energy efficiency, recycle/reuse/repurpose, green resources, etc.).             | Team Activity, Data Analysis, Written Exam | AFNR Career Cluster, Statement 2<br>AFNR Career Cluster, Statement 3 |
| CS.04.01.02.c. Evaluate sustainability policies and plans and prepare summary of potential improvements for AFNR businesses or organizations.   | Team Activity, Data Analysis, Written Exam | AFNR Career Cluster, Statement 2<br>AFNR Career Cluster, Statement 3 |

**CS.04.02. Performance Indicator: Assess the natural resource related trends, technologies and policies that impact AFNR systems**

|   |  |                                  |
|---|--|----------------------------------|
| CS.04.02.01.b. Analyze natural resources trends and technologies and document how they impact AFNR systems (e.g., climate change, green technologies, water resources, etc.). | Team Activity, Written Exam, Data Analysis | AFNR Career Cluster, Statement 7 |
| CS.04.02.01.c. Defend or challenge natural resources trends and technologies based upon an assessment of their impact on AFNR systems.  | Team Activity                              | AFNR Career Cluster, Statement 7 |

**CS.06.01. Performance Indicator: Explain foundational cycles and systems of AFNR.**

|  |               |  |
|--|---------------|--|
| CS.06.01.01.b. Analyze how foundational cycles affect production, processing and management of food, fiber and fuel. | Written Exam  |  |
| CS.06.01.01.c. Teach others about the impact of foundational cycles within AFNR systems.                             | Team Activity |  |



|  |                            |  |
|--|----------------------------|--|
| <p>CS.06.01.02.b. Analyze AFNR systems and determine their impact on producing and processing food, fiber and fuel.</p>  | <p>Team Activity</p>       |  |
| <p>CS.06.01.02.c. Evaluate AFNR systems and predict how the systems may change or adapt in the future of food, fiber and fuel production based on current trends and data.</p> | <p>Team Activity, Data</p> |  |

**CS.06.02. Performance Indicator: Explain the connection and relationships between different AFNR systems on a national and global level.**

|   |                                    |  |
|---|------------------------------------|--|
| <p>CS.06.02.01.b. Analyze differences between AFNR systems on a national and global scale. Team Activity, Written Exam</p>                        |                                    |  |
| <p>CS.06.02.01.c. Evaluate how AFNR systems impact each other on a national and global level.</p>   | <p>Team Activity, Written Exam</p> |  |
| <p>CS.06.02.02.b. Analyze the connections and relationships impacted when there is a change in an AFNR system on a national and global level.</p> | <p>Team Activity, Written Exam</p> |  |
| <p>CS.06.02.02.c. Evaluate how changes in one AFNR system can benefit cost components of other systems on a national and global level.</p>        | <p>Team Activity, Written Exam</p> |  |

**ESS.01.01. Performance Indicator: Analyze and interpret laboratory and field samples in environmental service systems.**

|   |                       |  |
|---|-----------------------|--|
| <p>ESS.01.01.01.b. Determine the appropriate sampling techniques needed to generate data.</p> | <p>Water Analysis</p> | <p>CCSS.ELA-LITERACY.SL.11-12.5<br/>                 CCSS.ELA-LITERACY.RST.11-12.9<br/>                 CCSS.MATH.CONTENT.HSN.Q.A.1<br/>                 CCSS.MATH.CONTENT.HSN.Q.A.2<br/>                 CCSS.MATH.CONTENT.HSN.Q.A.3<br/>                 CCSS.MATH.CONTENT.HSS.ID.A.2<br/>                 CCSS.MATH.CONTENT.HSS.ID.B.5<br/>                 HS-ESS2-2</p> |
|---|-----------------------|--|

|  |                       |  |
|--|-----------------------|--|
| <p>ESS.01.01.01.c. Collect and prepare sample measurements using appropriate data collection techniques.</p> | <p>Water Analysis</p> | <p>CCSS.ELA-LITERACY.SL.11-12.5<br/>                 CCSS.ELA-LITERACY.RST.11-12.9<br/>                 CCSS.MATH.CONTENT.HSN.Q.A.1<br/>                 CCSS.MATH.CONTENT.HSN.Q.A.2<br/>                 CCSS.MATH.CONTENT.HSN.Q.A.3<br/>                 CCSS.MATH.CONTENT.HSS.ID.A.2<br/>                 CCSS.MATH.CONTENT.HSS.ID.B.5<br/>                 HS-ESS2-2</p> |
|--|-----------------------|--|

**ESS.01.02. Performance Indicator: Properly utilize scientific instruments in environmental monitoring situations (e.g., laboratory equipment, environmental monitoring instruments, etc.).**

|   |  |  |
|---|--|--|
| <p>ESS.01.02.01.b. Demonstrate the proper use and maintenance of basic laboratory equipment.</p>                          | <p>Water Analysis, Gps</p>                   |  |
| <p>ESS.01.02.01.c. Calibrate and use laboratory equipment according to standard operating procedures.</p>                 | <p>Gps, Water Analysis</p>                   |  |
| <p>ESS.01.02.02.b. Demonstrate the proper use and maintenance of environmental monitoring instruments.</p>                | <p>Water Analysis, Gps, Soils Management</p> |  |
| <p>ESS.01.02.02.c. Calibrate and use environmental monitoring instruments according to standard operating procedures.</p> | <p>Gps, Water Analysis</p>                   |  |

**ESS.02.01. Performance Indicator: Interpret and evaluate the impact of laws, agencies, policies and practices affecting environmental service systems.**

|  |                      |  |
|--|----------------------|--|
| <p>ESS.02.01.02.c. Evaluate the impact and effectiveness of government agencies (i.e., local, state, and federal) associated with environmental service systems (e.g., regulation of consumption, prevention of damage to natural resources systems, management of ecological interactions, etc.).</p> | <p>Team Activity</p> | <p>AFNR Career Cluster, Statement 2<br/>                 AFNR Career Cluster, Agribusiness Systems Pathway, Statement 1<br/>                 AFNR Career Cluster, Natural Resources Systems Pathway, Statement 2<br/>                 STEM Career Cluster, Statement 3</p> |
|--|----------------------|--|

**ESS.02.02. Performance Indicator: Compare and contrast the impact of current trends on regulation of environmental service systems (e.g., climate change, population growth, international trade, etc.).**

|  |                                     |  |
|--|-------------------------------------|--|
| <p>ESS.02.02.03.b. Analyze the correlation between increased population size and the need for regulation of environmental service systems.</p> | <p>Team Activity, Data Analysis</p> |  |
|--|-------------------------------------|--|

|   |               |   |
|---|---------------|---|
| ESS.02.02.03.c. Predict the impact of future population growth on the regulation of environmental service systems and evaluate how changes made today will impact future regulation.                            | Team Activity |   |
| ESS.02.02.04.b. Assess whether current policies related to fracking and shale oil gas sufficiently address the needs of environmental service systems.  | Team Activity |   |
| ESS.02.02.04.c. Evaluate current fracking policies and create suggestions for modification of these policies to more thoroughly address the needs related to environmental, economic and social sustainability. | Team Activity |   |
| <b>ESS.02.03. Performance Indicator: Examine the impact of public perceptions and social movements on the regulation of environmental service systems.</b>  |               |   |
| ESS.02.03.01.b. Analyze and summarize specific changes to perceptions and regulations of environmental service systems and their impact on reducing the ecological, economical and sociological impact.         | Team Activity |   |
| ESS.02.03.01.c. Evaluate the impact of specific historical figures, or organizations, on the perception and regulation of environmental service systems.  | Team Activity |   |
| <b>ESS.03.01. Performance Indicator: Apply meteorology principles to environmental service systems.</b>   |               |   |
| ESS.03.01.02.b. Analyze and articulate the relationship between meteorological conditions, air quality and air pollutants.  | Data Analysis | CCSS.ELA-LITERACY.RST.11-12.1<br>CCSS.ELA-LITERACY.RST.11-12.2<br>CCSS.ELA-LITERACY.RST.11-12.7<br>CCSS.ELA-LITERACY.WHST.9-12.7<br>CCSS.MATH.CONTENT.HSN-Q.A.1<br>CCSS.MATH.CONTENT.HSN-Q.A.2<br>CCSS.MATH.CONTENT.HSN-Q.A.3<br>HS-ESS2-6<br>HS-ESS3-5 |

|   |  |   |
|---|--|---|
| ESS.03.01.04.b. Analyze the basics of the greenhouse effect and describe how the greenhouse effect alters the earth’s balance of energy.  | Exam   | CCSS.ELA-LITERACY.RST.11-12.1<br>CCSS.ELA-LITERACY.RST.11-12.2<br>CCSS.ELA-LITERACY.RST.11-12.7<br>CCSS.ELA-LITERACY.WHST.9-12.7<br>CCSS.MATH.CONTENT.HSN-Q.A.1<br>CCSS.MATH.CONTENT.HSN-Q.A.2<br>CCSS.MATH.CONTENT.HSN-Q.A.3<br>HS-ESS2-6<br>HS-ESS3-5                                   |
| <b>ESS.03.02. Performance Indicator: Apply soil science and hydrology principles to environmental service systems.</b>  |  |   |
| ESS.03.02.01.b. Use a soil survey to determine the land capability classes for different parcels of land in an area.  | Team Activity, Soils Analysis, Data Analysis, Written Exam | CCSS.ELA-LITERACY.RST.11-12.1<br>CCSS.ELA-LITERACY.RST.11-12.2<br>CCSS.ELA-LITERACY.RST.11-12.7<br>CCSS.ELA-LITERACY.WHST.9-10.7<br>CCSS.ELA-LITERACY.WHST.11-12.7<br>CCSS.MATH.CONTENT.HSN-Q.A.1<br>CCSS.MATH.CONTENT.HSN-Q.A.2<br>CCSS.MATH.CONTENT.HSN-Q.A.3<br>HS-ESS2-5<br>HS-ESS2-6 |
| ESS.03.02.01.c. Design a master land-use management plan for a given area that utilizes land capability classes in order to minimize erosion and flooding, maximize development and preservation of topsoil, et cetera. | Team Activity, Soils Analysis, Data Analysis, Written Exam | CCSS.ELA-LITERACY.RST.11-12.1<br>CCSS.ELA-LITERACY.RST.11-12.2<br>CCSS.ELA-LITERACY.RST.11-12.7<br>CCSS.ELA-LITERACY.WHST.9-10.7<br>CCSS.ELA-LITERACY.WHST.11-12.7<br>CCSS.MATH.CONTENT.HSN-Q.A.1<br>CCSS.MATH.CONTENT.HSN-Q.A.2<br>CCSS.MATH.CONTENT.HSN-Q.A.3<br>HS-ESS2-5<br>HS-ESS2-6 |
| ESS.03.02.02.b. Differentiate rock types and relate the chemical composition of mineral matter in soils to the parent material.   | Team Activity, Soils Analysis, Data Analysis, Written Exam | CCSS.ELA-LITERACY.RST.11-12.1<br>CCSS.ELA-LITERACY.RST.11-12.2<br>CCSS.ELA-LITERACY.RST.11-12.7<br>CCSS.ELA-LITERACY.WHST.9-10.7<br>CCSS.ELA-LITERACY.WHST.11-12.7<br>CCSS.MATH.CONTENT.HSN-Q.A.1<br>CCSS.MATH.CONTENT.HSN-Q.A.2<br>CCSS.MATH.CONTENT.HSN-Q.A.3<br>HS-ESS2-5<br>HS-ESS2-6 |
| ESS.03.02.02.c. Evaluate the soil composition in order to predict the impact of that soil on environmental service systems.   | Team Activity, Soils Analysis, Data Analysis, Written Exam | CCSS.ELA-LITERACY.RST.11-12.1<br>CCSS.ELA-LITERACY.RST.11-12.2<br>CCSS.ELA-LITERACY.RST.11-12.7<br>CCSS.ELA-LITERACY.WHST.9-10.7<br>CCSS.ELA-LITERACY.WHST.11-12.7<br>CCSS.MATH.CONTENT.HSN-Q.A.1   |

|   |   |  |
|---|---|--|
|   |   | <p>CCSS.MATH.CONTENT.HSN-Q.A.2<br/>                 CCSS.MATH.CONTENT.HSN-Q.A.3<br/>                 HS-ESS2-5<br/>                 HS-ESS2-6</p>  |
| <p>ESS.03.02.03.b. Assess the physical qualities of the soil that determine its potential for filtration of groundwater supplies and likelihood for flooding.</p> | <p>Team Activity, Soils Analysis, Data Analysis, Written Exam</p> | <p>CCSS.ELA-LITERACY.RST.11-12.1<br/>                 CCSS.ELA-LITERACY.RST.11-12.2<br/>                 CCSS.ELA-LITERACY.RST.11-12.7<br/>                 CCSS.ELA-LITERACY.WHST.9-10.7<br/>                 CCSS.ELA-LITERACY.WHST.11-12.7<br/>                 CCSS.MATH.CONTENT.HSN-Q.A.1<br/>                 CCSS.MATH.CONTENT.HSN-Q.A.2<br/>                 CCSS.MATH.CONTENT.HSN-Q.A.3<br/>                 HS-ESS2-5<br/>                 HS-ESS2-6</p> |
| <p>ESS.03.02.03.c. Conduct tests of soil to determine its potential for filtration of groundwater supplies and likelihood for flooding.</p>                       | <p>Team Activity, Soils Analysis, Data Analysis, Written Exam</p> | <p>CCSS.ELA-LITERACY.RST.11-12.1<br/>                 CCSS.ELA-LITERACY.RST.11-12.2<br/>                 CCSS.ELA-LITERACY.RST.11-12.7<br/>                 CCSS.ELA-LITERACY.WHST.9-10.7<br/>                 CCSS.ELA-LITERACY.WHST.11-12.7<br/>                 CCSS.MATH.CONTENT.HSN-Q.A.1<br/>                 CCSS.MATH.CONTENT.HSN-Q.A.2<br/>                 CCSS.MATH.CONTENT.HSN-Q.A.3<br/>                 HS-ESS2-5<br/>                 HS-ESS2-6</p> |
| <p>ESS.03.02.04.b. Assess precautions taken to prevent or reduce contamination of groundwater supplies.</p>   | <p>Team Activity, Soils Analysis, Data Analysis, Written Exam</p> | <p>CCSS.ELA-LITERACY.RST.11-12.1<br/>                 CCSS.ELA-LITERACY.RST.11-12.2<br/>                 CCSS.ELA-LITERACY.RST.11-12.7<br/>                 CCSS.ELA-LITERACY.WHST.9-10.7<br/>                 CCSS.ELA-LITERACY.WHST.11-12.7<br/>                 CCSS.MATH.CONTENT.HSN-Q.A.1<br/>                 CCSS.MATH.CONTENT.HSN-Q.A.2<br/>                 CCSS.MATH.CONTENT.HSN-Q.A.3<br/>                 HS-ESS2-5<br/>                 HS-ESS2-6</p> |
| <p>ESS.03.02.04.c. Evaluate the methods used in a given example to protect groundwater supplies.</p>  | <p>Team Activity, Soils Analysis, Data Analysis, Written Exam</p> | <p>CCSS.ELA-LITERACY.RST.11-12.1<br/>                 CCSS.ELA-LITERACY.RST.11-12.2<br/>                 CCSS.ELA-LITERACY.RST.11-12.7<br/>                 CCSS.ELA-LITERACY.WHST.9-10.7<br/>                 CCSS.ELA-LITERACY.WHST.11-12.7<br/>                 CCSS.MATH.CONTENT.HSN-Q.A.1<br/>                 CCSS.MATH.CONTENT.HSN-Q.A.2<br/>                 CCSS.MATH.CONTENT.HSN-Q.A.3<br/>                 HS-ESS2-5<br/>                 HS-ESS2-6</p> |

|  |   |  |
|--|---|--|
| <p>ESS.03.02.05.b. Analyze how interactions between groundwater and surface water affect flow and availability of water.</p>   | <p>Team Activity, Soils Analysis, Data Analysis, Written Exam</p> | <p>CCSS.ELA-LITERACY.RST.11-12.1<br/>                 CCSS.ELA-LITERACY.RST.11-12.2<br/>                 CCSS.ELA-LITERACY.RST.11-12.7<br/>                 CCSS.ELA-LITERACY.WHST.9-10.7<br/>                 CCSS.ELA-LITERACY.WHST.11-12.7<br/>                 CCSS.MATH.CONTENT.HSN-Q.A.1<br/>                 CCSS.MATH.CONTENT.HSN-Q.A.2<br/>                 CCSS.MATH.CONTENT.HSN-Q.A.3<br/>                 HS-ESS2-5<br/>                 HS-ESS2-6</p> |
| <p>ESS.03.02.05.c. Construct explanations and solutions to situations involving the declining availability of water that incorporate groundwater flow equations as well as human activity.</p> | <p>Team Activity, Soils Analysis, Data Analysis, Written Exam</p> | <p>CCSS.ELA-LITERACY.RST.11-12.1<br/>                 CCSS.ELA-LITERACY.RST.11-12.2<br/>                 CCSS.ELA-LITERACY.RST.11-12.7<br/>                 CCSS.ELA-LITERACY.WHST.9-10.7<br/>                 CCSS.ELA-LITERACY.WHST.11-12.7<br/>                 CCSS.MATH.CONTENT.HSN-Q.A.1<br/>                 CCSS.MATH.CONTENT.HSN-Q.A.2<br/>                 CCSS.MATH.CONTENT.HSN-Q.A.3<br/>                 HS-ESS2-5<br/>                 HS-ESS2-6</p> |
| <p>ESS.03.02.06.b. Analyze the importance of the roles played by wetlands in regards to water availability, prevention of flooding and other factors.</p>                                      | <p>Team Activity, Soils Analysis, Data Analysis, Written Exam</p> | <p>CCSS.ELA-LITERACY.RST.11-12.1<br/>                 CCSS.ELA-LITERACY.RST.11-12.2<br/>                 CCSS.ELA-LITERACY.RST.11-12.7<br/>                 CCSS.ELA-LITERACY.WHST.9-10.7<br/>                 CCSS.ELA-LITERACY.WHST.11-12.7<br/>                 CCSS.MATH.CONTENT.HSN-Q.A.1<br/>                 CCSS.MATH.CONTENT.HSN-Q.A.2<br/>                 CCSS.MATH.CONTENT.HSN-Q.A.3<br/>                 HS-ESS2-5<br/>                 HS-ESS2-6</p> |
| <p>ESS.03.02.06.c Evaluate and select strategies for wetlands preservation and restoration that maximize services provided by wetlands while taking human concerns into consideration.</p>     | <p>Team Activity, Soils Analysis, Data Analysis, Written Exam</p> | <p>CCSS.ELA-LITERACY.RST.11-12.1<br/>                 CCSS.ELA-LITERACY.RST.11-12.2<br/>                 CCSS.ELA-LITERACY.RST.11-12.7<br/>                 CCSS.ELA-LITERACY.WHST.9-10.7<br/>                 CCSS.ELA-LITERACY.WHST.11-12.7<br/>                 CCSS.MATH.CONTENT.HSN-Q.A.1<br/>                 CCSS.MATH.CONTENT.HSN-Q.A.2<br/>                 CCSS.MATH.CONTENT.HSN-Q.A.3<br/>                 HS-ESS2-5<br/>                 HS-ESS2-6</p> |

**ESS.03.03. Performance Indicator: Apply chemistry principles to environmental service systems.**

|   |   |  |
|---|---|--|
| <p>ESS.03.03.01b. Analyze the soil chemistry of a sample.</p> | <p>Water Analysis, Data Analysis, Soil Analysis</p> | <p>CCSS.ELA-LITERACY.RST.9-10.7<br/>                 CCSS.ELA-LITERACY.RST.11-12.1<br/>                 CCSS.ELA-LITERACY.RST.11-12.2<br/>                 CCSS.ELA-LITERACY.WHST.9-10.2<br/>                 CCSS.ELA-LITERACY.WHST.11-12.2</p> |
|---|---|--|

|   |   |  |
|---|---|--|
|   |   | <p>CCSS.ELA-LITERACY.WHST.9-10.5<br/>                 CCSS.ELA-LITERACY.WHST.11-12.5<br/>                 CCSS.MATH.CONTENT.HSN-Q.A.1<br/>                 CCSS.MATH.CONTENT.HSN-Q.A.3<br/>                 HS-ESS2-6</p>  |
| <p>ESS.03.03.01.c. Evaluate a sample’s soil chemistry and assess the impact on considerations in environmental service systems.</p>                     | <p>Water Analysis, Data Analysis, Soil Analysis</p>       | <p>CCSS.ELA-LITERACY.RST.9-10.7<br/>                 CCSS.ELA-LITERACY.RST.11-12.1<br/>                 CCSS.ELA-LITERACY.RST.11-12.2<br/>                 CCSS.ELA-LITERACY.WHST.9-10.2<br/>                 CCSS.ELA-LITERACY.WHST.11-12.2<br/>                 CCSS.ELA-LITERACY.WHST.9-10.5<br/>                 CCSS.ELA-LITERACY.WHST.11-12.5<br/>                 CCSS.MATH.CONTENT.HSN-Q.A.1<br/>                 CCSS.MATH.CONTENT.HSN-Q.A.3<br/>                 HS-ESS2-6</p> |
| <p>ESS.03.03.02.b. Analyze the water chemistry of a sample.</p>   | <p>Water Analysis, Data Analysis, Soil Analysis</p>       | <p>CCSS.ELA-LITERACY.RST.9-10.7<br/>                 CCSS.ELA-LITERACY.RST.11-12.1<br/>                 CCSS.ELA-LITERACY.RST.11-12.2<br/>                 CCSS.ELA-LITERACY.WHST.9-10.2<br/>                 CCSS.ELA-LITERACY.WHST.11-12.2<br/>                 CCSS.ELA-LITERACY.WHST.9-10.5<br/>                 CCSS.ELA-LITERACY.WHST.11-12.5<br/>                 CCSS.MATH.CONTENT.HSN-Q.A.1<br/>                 CCSS.MATH.CONTENT.HSN-Q.A.3<br/>                 HS-ESS2-6</p> |
| <p>ESS.03.03.02.c. Evaluate a sample’s water chemistry and assess it’s impact on considerations in environmental service systems.</p>                   | <p>Water Analysis, Data Analysis, Soil Analysis</p>       | <p>CCSS.ELA-LITERACY.RST.9-10.7<br/>                 CCSS.ELA-LITERACY.RST.11-12.1<br/>                 CCSS.ELA-LITERACY.RST.11-12.2<br/>                 CCSS.ELA-LITERACY.WHST.9-10.2<br/>                 CCSS.ELA-LITERACY.WHST.11-12.2<br/>                 CCSS.ELA-LITERACY.WHST.9-10.5<br/>                 CCSS.ELA-LITERACY.WHST.11-12.5<br/>                 CCSS.MATH.CONTENT.HSN-Q.A.1<br/>                 CCSS.MATH.CONTENT.HSN-Q.A.3<br/>                 HS-ESS2-6</p> |
| <p>ESS.03.03.04.b. Assess how different kinds of wetlands are formed based on the different kinds of soil and water chemistry present in each case.</p> | <p>Team Activity, Exam, Data Analysis, Soils Analysis</p> | <p>CCSS.ELA-LITERACY.RST.9-10.7<br/>                 CCSS.ELA-LITERACY.RST.11-12.1<br/>                 CCSS.ELA-LITERACY.RST.11-12.2<br/>                 CCSS.ELA-LITERACY.WHST.9-10.2<br/>                 CCSS.ELA-LITERACY.WHST.11-12.2<br/>                 CCSS.ELA-LITERACY.WHST.9-10.5<br/>                 CCSS.ELA-LITERACY.WHST.11-12.5<br/>                 CCSS.MATH.CONTENT.HSN-Q.A.1<br/>                 CCSS.MATH.CONTENT.HSN-Q.A.3<br/>                 HS-ESS2-6</p> |

|  |   |  |
|--|---|--|
| <p>ESS.03.03.04.c. Evaluate the services provided by types of wetlands and predict how different types of wetlands respond to pressures due to human activity.</p> | <p>Team Activity, Exam, Data Analysis, Soils Analysis</p> | <p>CCSS.ELA-LITERACY.RST.9-10.7<br/>                 CCSS.ELA-LITERACY.RST.11-12.1<br/>                 CCSS.ELA-LITERACY.RST.11-12.2<br/>                 CCSS.ELA-LITERACY.WHST.9-10.2<br/>                 CCSS.ELA-LITERACY.WHST.11-12.2<br/>                 CCSS.ELA-LITERACY.WHST.9-10.5<br/>                 CCSS.ELA-LITERACY.WHST.11-12.5<br/>                 CCSS.MATH.CONTENT.HSN-Q.A.1<br/>                 CCSS.MATH.CONTENT.HSN-Q.A.3<br/>                 HS-ESS2-6</p> |
|--|---|--|

**ESS.03.04. Performance Indicator: Apply microbiology principles to environmental service systems.**

|  |                                      |   |
|--|--------------------------------------|---|
| <p>ESS.03.04.01.c. Evaluate how soil microorganisms in environmental service systems can be used to minimize waste, maximize nutrient cycling and increase ecosystem biodiversity.</p> | <p>Team Activity, Soils Analysis</p> | <p>CCSS.ELA-LITERACY.RST.11-12.1<br/>                 CCSS.ELA-LITERACY.WHST.9-10.2<br/>                 CCSS.ELA-LITERACY.WHST.11-12.2<br/>                 CCSS.ELA-LITERACY.WHST.9-10.5<br/>                 CCSS.ELA-LITERACY.WHST.11-12.5<br/>                 CCSS.ELA-LITERACY.WHST.9-10.9<br/>                 CCSS.ELA-LITERACY.WHST.11-12.9<br/>                 CCSS.MATH.CONTENT.HSF.BF.A.1<br/>                 HS-LS2-3<br/>                 HS-LS3-2<br/>                 HS-ET1-2</p> |
|--|--------------------------------------|---|

|  |                                      |   |
|--|--------------------------------------|---|
| <p>ESS.03.04.02.c. Develop strategies for negating air pollutants based on soil microbial populations (e.g., carbon sequestration and rates of decomposition).</p> | <p>Team Activity, Soils Analysis</p> | <p>CCSS.ELA-LITERACY.RST.11-12.1<br/>                 CCSS.ELA-LITERACY.WHST.9-10.2<br/>                 CCSS.ELA-LITERACY.WHST.11-12.2<br/>                 CCSS.ELA-LITERACY.WHST.9-10.5<br/>                 CCSS.ELA-LITERACY.WHST.11-12.5<br/>                 CCSS.ELA-LITERACY.WHST.9-10.9<br/>                 CCSS.ELA-LITERACY.WHST.11-12.9<br/>                 CCSS.MATH.CONTENT.HSF.BF.A.1<br/>                 HS-LS2-3<br/>                 HS-LS3-2<br/>                 HS-ET1-2</p> |
|--|--------------------------------------|---|

|  |                       |   |
|--|-----------------------|---|
| <p>ESS.03.04.03.b. Assess the impact of wastewater treatment on environmental service systems.</p> | <p>Water Analysis</p> | <p>CCSS.ELA-LITERACY.RST.11-12.1<br/>                 CCSS.ELA-LITERACY.WHST.9-10.2<br/>                 CCSS.ELA-LITERACY.WHST.11-12.2<br/>                 CCSS.ELA-LITERACY.WHST.9-10.5<br/>                 CCSS.ELA-LITERACY.WHST.11-12.5<br/>                 CCSS.ELA-LITERACY.WHST.9-10.9<br/>                 CCSS.ELA-LITERACY.WHST.11-12.9<br/>                 CCSS.MATH.CONTENT.HSF.BF.A.1<br/>                 HS-LS2-3<br/>                 HS-LS3-2<br/>                 HS-ET1-2</p> |
|--|-----------------------|---|



|   |  |   |
|---|--|---|
| <p>ESS.03.04.03.c. Evaluate modern uses of microbial waste water treatment and devise strategies to further reduce the environmental, economic and social impact of wastewater treatment.</p> | <p>Team Activity, Soils Analysis, Water Analysis</p> | <p>CCSS.ELA-LITERACY.RST.11-12.1<br/>                 CCSS.ELA-LITERACY.WHST.9-10.2<br/>                 CCSS.ELA-LITERACY.WHST.11-12.2<br/>                 CCSS.ELA-LITERACY.WHST.9-10.5<br/>                 CCSS.ELA-LITERACY.WHST.11-12.5<br/>                 CCSS.ELA-LITERACY.WHST.9-10.9<br/>                 CCSS.ELA-LITERACY.WHST.11-12.9<br/>                 CCSS.MATH.CONTENT.HSF.BF.A.1<br/>                 HS-LS2-3<br/>                 HS-LS3-2<br/>                 HS-ET1-2</p> |
|---|--|---|

**ESS.03.05. Performance Indicator: Apply ecology principles to environmental service systems.**

|   |                      |   |
|---|----------------------|---|
| <p>ESS.03.05.01.c. Evaluate the biodiversity of an area and predict the impact of changing the levels of biodiversity on environmental service systems.</p> | <p>Team Activity</p> | <p>CCSS.ELA-LITERACY.RST.9-10.8<br/>                 CCSS.ELA-LITERACY.RST.11-12.1<br/>                 CCSS.ELA-LITERACY.RST.11-12.7<br/>                 CCSS.ELA-LITERACY.RST.11-12.8<br/>                 CCSS.ELA-LITERACY.WHST.9-10.2<br/>                 CCSS.ELA-LITERACY.WHST.11-12.2<br/>                 CCSS.ELA-LITERACY.WHST.9-10.9<br/>                 CCSS.ELA-LITERACY.WHST.11-12.9<br/>                 CCSS.MATH.CONTENT.HSN-Q.A.1<br/>                 CCSS.MATH.CONTENT.HSN-Q.A.2<br/>                 CCSS.MATH.CONTENT.HSN-Q.A.3<br/>                 HS-LS2-1<br/>                 HS-LS4-4</p> |
|---|----------------------|---|

|  |                      |   |
|--|----------------------|---|
| <p>ESS.03.05.02.b. Assess the impact of the current rate of habitat loss on environmental service systems.</p> | <p>Team Activity</p> | <p>CCSS.ELA-LITERACY.RST.9-10.8<br/>                 CCSS.ELA-LITERACY.RST.11-12.1<br/>                 CCSS.ELA-LITERACY.RST.11-12.7<br/>                 CCSS.ELA-LITERACY.RST.11-12.8<br/>                 CCSS.ELA-LITERACY.WHST.9-10.2<br/>                 CCSS.ELA-LITERACY.WHST.11-12.2<br/>                 CCSS.ELA-LITERACY.WHST.9-10.9<br/>                 CCSS.ELA-LITERACY.WHST.11-12.9<br/>                 CCSS.MATH.CONTENT.HSN-Q.A.1<br/>                 CCSS.MATH.CONTENT.HSN-Q.A.2<br/>                 CCSS.MATH.CONTENT.HSN-Q.A.3<br/>                 HS-LS2-1<br/>                 HS-LS4-4</p> |
|--|----------------------|---|

|   |                      |  |
|---|----------------------|--|
| <p>ESS.03.05.02.c. Evaluate the importance of habitat to environmental service systems and devise strategies to minimize the future loss of habitats.</p> | <p>Team Activity</p> | <p>CCSS.ELA-LITERACY.RST.9-10.8<br/>                 CCSS.ELA-LITERACY.RST.11-12.1<br/>                 CCSS.ELA-LITERACY.RST.11-12.7<br/>                 CCSS.ELA-LITERACY.RST.11-12.8<br/>                 CCSS.ELA-LITERACY.WHST.9-10.2<br/>                 CCSS.ELA-LITERACY.WHST.11-12.2<br/>                 CCSS.ELA-LITERACY.WHST.9-10.9<br/>                 CCSS.ELA-LITERACY.WHST.11-12.9</p> |
|---|----------------------|--|

|   |                      |   |
|---|----------------------|---|
|   |                      | <p>CCSS.MATH.CONTENT.HSN-Q.A.1<br/> CCSS.MATH.CONTENT.HSN-Q.A.2<br/> CCSS.MATH.CONTENT.HSN-Q.A.3<br/> HS-LS2-1<br/> HS-LS4-4</p>  |
| <p>ESS.03.05.03.b. Assess the impact of a population exceeding its carrying capacity on environmental service systems.</p>  | <p>Team Activity</p> | <p>CCSS.ELA-LITERACY.RST.9-10.8<br/> CCSS.ELA-LITERACY.RST.11-12.1<br/> CCSS.ELA-LITERACY.RST.11-12.7<br/> CCSS.ELA-LITERACY.RST.11-12.8<br/> CCSS.ELA-LITERACY.WHST.9-10.2<br/> CCSS.ELA-LITERACY.WHST.11-12.2<br/> CCSS.ELA-LITERACY.WHST.9-10.9<br/> CCSS.ELA-LITERACY.WHST.11-12.9<br/> CCSS.MATH.CONTENT.HSN-Q.A.1<br/> CCSS.MATH.CONTENT.HSN-Q.A.2<br/> CCSS.MATH.CONTENT.HSN-Q.A.3<br/> HS-LS2-1<br/> HS-LS4-4</p> |
| <p>ESS.03.05.03.c. Devise a strategy for monitoring and supporting environmental service systems through management of a species' carrying capacity.</p>                      | <p>Team Activity</p> | <p>CCSS.ELA-LITERACY.RST.9-10.8<br/> CCSS.ELA-LITERACY.RST.11-12.1<br/> CCSS.ELA-LITERACY.RST.11-12.7<br/> CCSS.ELA-LITERACY.RST.11-12.8<br/> CCSS.ELA-LITERACY.WHST.9-10.2<br/> CCSS.ELA-LITERACY.WHST.11-12.2<br/> CCSS.ELA-LITERACY.WHST.9-10.9<br/> CCSS.ELA-LITERACY.WHST.11-12.9<br/> CCSS.MATH.CONTENT.HSN-Q.A.1<br/> CCSS.MATH.CONTENT.HSN-Q.A.2<br/> CCSS.MATH.CONTENT.HSN-Q.A.3<br/> HS-LS2-1<br/> HS-LS4-4</p> |
| <p>ESS.03.05.04.a. Examine how ecological interactions can be used to assess environmental service systems (i.e., macroinvertebrates and/or amphibians as bioindicators).</p> | <p>Team Activity</p> | <p>CCSS.ELA-LITERACY.RST.9-10.8<br/> CCSS.ELA-LITERACY.RST.11-12.1<br/> CCSS.ELA-LITERACY.RST.11-12.7<br/> CCSS.ELA-LITERACY.RST.11-12.8<br/> CCSS.ELA-LITERACY.WHST.9-10.2<br/> CCSS.ELA-LITERACY.WHST.11-12.2<br/> CCSS.ELA-LITERACY.WHST.9-10.9<br/> CCSS.ELA-LITERACY.WHST.11-12.9<br/> CCSS.MATH.CONTENT.HSN-Q.A.1<br/> CCSS.MATH.CONTENT.HSN-Q.A.2<br/> CCSS.MATH.CONTENT.HSN-Q.A.3<br/> HS-LS2-1<br/> HS-LS4-4</p> |

|   |  |   |
|---|--|---|
| <p>ESS.03.05.04.c. Utilize evidence from bioindicator species to detect pollutants in a given area.</p> | <p>Data Analysis, Waste Management</p> | <p>CCSS.ELA-LITERACY.RST.9-10.8<br/>                 CCSS.ELA-LITERACY.RST.11-12.1<br/>                 CCSS.ELA-LITERACY.RST.11-12.7<br/>                 CCSS.ELA-LITERACY.RST.11-12.8<br/>                 CCSS.ELA-LITERACY.WHST.9-10.2<br/>                 CCSS.ELA-LITERACY.WHST.11-12.2<br/>                 CCSS.ELA-LITERACY.WHST.9-10.9<br/>                 CCSS.ELA-LITERACY.WHST.11-12.9<br/>                 CCSS.MATH.CONTENT.HSN-Q.A.1<br/>                 CCSS.MATH.CONTENT.HSN-Q.A.2<br/>                 CCSS.MATH.CONTENT.HSN-Q.A.3<br/>                 HS-LS2-1<br/>                 HS-LS4-4</p> |
|---|--|---|

**ESS.04.01. Performance Indicator: Use pollution control measures to maintain a safe facility and environment.**

|  |  |                  |
|--|--|------------------|
| <p>ESS.04.01.01.b. Assess how industrial and nonindustrial pollution has damaged the environment.</p>      | <p>Waste Management</p>                | <p>HS-ETS1-2</p> |
| <p>ESS.04.01.01.c. Evaluate evidence for a given area for industrial and nonindustrial pollution.</p>      | <p>Team Activity, Waste Management</p> | <p>HS-ETS1-2</p> |
| <p>ESS.04.01.02.c. Create a plan for pollution remediation, management or prevention for a given area.</p> | <p>Team Activity, Waste Management</p> | <p>HS-ETS1-2</p> |
| <p>ESS.04.01.03.a. Interpret the conditions necessary for waste to be labeled as hazardous.</p>            | <p>Team Activity, Waste Management</p> | <p>HS-ETS1-2</p> |
| <p>ESS.04.01.03.b. Classify examples of pollution as hazardous or nonhazardous.</p>                        | <p>Data Analysis, Waste Management</p> | <p>HS-ETS1-2</p> |
| <p>ESS.04.01.03.c. Construct a plan for handling hazardous waste in given situations.</p>                  | <p>Team Activity, Waste Management</p> | <p>HS-ETS1-2</p> |

**ESS.04.02. Performance Indicator: Manage safe disposal of all categories of solid waste in environmental service systems.**

|  |                         |                  |
|--|-------------------------|------------------|
| <p>ESS.04.02.01.b. Analyze environmental hazards created by different types of solid waste, solid waste accumulation and solid waste disposal.</p> | <p>Waste Management</p> | <p>HS-ETS1-2</p> |
|--|-------------------------|------------------|

|  |                                 |  |
|--|---------------------------------|--|
| ESS.04.02.01.c. Develop a plan for solid waste disposal for a given situation that considers the environmental hazards, economic realities and social concerns associated with this task.  | Team Activity, Waste Management | HS-ETS1-2  |
| ESS.04.02.03.b. Apply scientific principles to explain the benefits and processes of composting.   | Exam                            | HS-ETS1-2  |
| ESS.04.02.03.c. Evaluate the appropriateness of composting methods in different situations.  | Team Activity, Waste Management | HS-ETS1-2  |
| ESS.04.02.04.b. Analyze and document different recycling methods and classify materials that can be recycled.  | Data Analysis                   | HS-ETS1-2  |
| ESS.04.02.04.c. Survey and evaluate recycling programs and procedures.   | Waste Management                | HS-ETS1-2  |
| <b>ESS.04.03. Performance Indicator: Apply techniques to ensure a safe supply of drinking water and adequate treatment of wastewater according to applicable rules and regulations.</b>    |                                 |  |
| ESS.04.03.01.c. Evaluate samples of water and the processes necessary to ensure the samples are safe for consumption.  | Waste Management                | HS-ETS1-2<br>HS-ETS1-4   |
| ESS.04.03.02.b. Analyze and document the steps necessary to ensure that wastewater and septic waste can be safely released into the environment.   | Waste Management                | HS-ETS1-2<br>HS-ETS1-4   |
| ESS.04.03.02.c. Evaluate examples of wastewater and/or septic waste for its potential to cause environmental, economic and/or social problems.   | Waste Management                | HS-ETS1-2<br>HS-ETS1-4   |
| <b>ESS.04.04. Performance Indicator: Compare and contrast the impact of conventional and alternative energy sources on the environment and operation of environmental service systems.</b> |                                 |  |
| ESS.04.04.02.b. Identify advantages and disadvantages of alternative energy sources as they pertain to environmental service systems.  | Team                            | CCSS.ELA-LITERACY.RST.11-12.1<br>CCSS.ELA-LITERACY.RST.11-12.8<br>CCSS.ELA-LITERACY.WHST.9-10.5<br>CCSS.ELA-LITERACY.WHST.11-12.5<br>CCSS.ELA-LITERACY.WHST.9-10.7 |

|   |                      |  |
|---|----------------------|--|
|   |                      | <p>CCSS.ELA-LITERACY.WHST.11-12.7<br/>                 CCSS.ELA-LITERACY.RST.11-12.2<br/>                 CCSS.ELA-LITERACY.RST.11-12.9<br/>                 CCSS.ELA-LITERACY.WHST 11-12.9<br/>                 CCSS.MATH.CONTENT.HSN-Q.A.1<br/>                 CCSS.MATH.CONTENT.HSN-Q.A.2<br/>                 CCSS.MATH.CONTENT.HSN-Q.A.3<br/>                 HS-ETS1-2<br/>                 HS-ETS1-4</p>   |
| <p>ESS.04.04.02.c. Evaluate the impact alternative energy sources have on environmental conditions.</p>   | <p>Team Activity</p> | <p>CCSS.ELA-LITERACY.RST.11-12.1<br/>                 CCSS.ELA-LITERACY.RST.11-12.8<br/>                 CCSS.ELA-LITERACY.WHST.9-10.5<br/>                 CCSS.ELA-LITERACY.WHST.11-12.5<br/>                 CCSS.ELA-LITERACY.WHST.9-10.7<br/>                 CCSS.ELA-LITERACY.WHST.11-12.7<br/>                 CCSS.ELA-LITERACY.RST.11-12.2<br/>                 CCSS.ELA-LITERACY.RST.11-12.9<br/>                 CCSS.ELA-LITERACY.WHST 11-12.9<br/>                 CCSS.MATH.CONTENT.HSN-Q.A.1<br/>                 CCSS.MATH.CONTENT.HSN-Q.A.2<br/>                 CCSS.MATH.CONTENT.HSN-Q.A.3<br/>                 HS-ETS1-2<br/>                 HS-ETS1-4</p> |
| <p>ESS.04.04.04.c. Devise a strategy for improving future energy consumption in a manner consistent with the intents of environmental service systems.</p>              | <p>Team Activity</p> | <p>CCSS.ELA-LITERACY.RST.11-12.1<br/>                 CCSS.ELA-LITERACY.RST.11-12.8<br/>                 CCSS.ELA-LITERACY.WHST.9-10.5<br/>                 CCSS.ELA-LITERACY.WHST.11-12.5<br/>                 CCSS.ELA-LITERACY.WHST.9-10.7<br/>                 CCSS.ELA-LITERACY.WHST.11-12.7<br/>                 CCSS.ELA-LITERACY.RST.11-12.2<br/>                 CCSS.ELA-LITERACY.RST.11-12.9<br/>                 CCSS.ELA-LITERACY.WHST 11-12.9<br/>                 CCSS.MATH.CONTENT.HSN-Q.A.1<br/>                 CCSS.MATH.CONTENT.HSN-Q.A.2<br/>                 CCSS.MATH.CONTENT.HSN-Q.A.3<br/>                 HS-ETS1-2<br/>                 HS-ETS1-4</p> |
| <p>ESS.04.04.05.c. Use data from environmental monitoring to evaluate methods for reducing the imbalance in the carbon cycle through changes to energy consumption.</p> | <p>Data Analysis</p> | <p>CCSS.ELA-LITERACY.RST.11-12.1<br/>                 CCSS.ELA-LITERACY.RST.11-12.8<br/>                 CCSS.ELA-LITERACY.WHST.9-10.5<br/>                 CCSS.ELA-LITERACY.WHST.11-12.5<br/>                 CCSS.ELA-LITERACY.WHST.9-10.7<br/>                 CCSS.ELA-LITERACY.WHST.11-12.7<br/>                 CCSS.ELA-LITERACY.RST.11-12.2<br/>                 CCSS.ELA-LITERACY.RST.11-12.9<br/>                 CCSS.ELA-LITERACY.WHST 11-12.9<br/>                 CCSS.MATH.CONTENT.HSN-Q.A.1</p>   |

|   |  |  |
|---|--|--|
|   |  | CCSS.MATH.CONTENT.HSN-Q.A.2<br>CCSS.MATH.CONTENT.HSN-Q.A.3<br>HS-ETS1-2<br>HS-ETS1-4 |
| <b>ESS.05.01. Performance Indicator: Use technological and mathematical tools to map land, facilities and infrastructure for environmental service systems.</b>                             |  |  |
| ESS.05.01.01.b. Apply surveying and mapping principles to a situation involving environmental service systems and identify and explain the use of equipment for surveying and mapping.      | Gps  | HS-ETS1-4  |
| ESS.05.01.01.c. Demonstrate surveying and cartographic skills to make site measurements in order to address concerns and needs within an environmental service systems situation.           | Gps  | HS-ETS1-4  |
| ESS.05.01.02.b. Apply GIS skills to a situation specific to environmental service systems.  | Gps  | HS-ETS1-4  |
| ESS.05.01.02.c. Interpret and evaluate GIS data to come to a conclusion about a scenario specific to environmental service systems.   | Team Activity, Data Analysis, Waste Management | HS-ETS1-4  |
| <b>ESS.05.02. Performance Indicator: Perform assessments of environmental conditions using equipment, machinery and technology.</b>   |  |  |
| ESS.05.02.02.b. Assess different measurements of soil quality (e.g., soil horizons, soil texture, organic matter, soil respiration, etc.) to determine their effectiveness and limitations. | Data Analysis                                  | HS-ETS1-4<br>HS-ETS1-2   |
| ESS.05.02.03.b. Assess different measurements of air quality (e.g., ozone, carbon monoxide, particulate matter, etc.) to determine their effectiveness and limitations.                     | Data Analysis                                  | HS-ETS1-4<br>HS-ETS1-2   |
| ESS.05.02.04.c. Evaluate a habitat to determine its ecological quality and if it is threatened.   | Waste Management                               | HS-ETS1-4<br>HS-ETS1-2   |

**NRS.01.01. Performance Indicator: Apply methods of classification to examine natural resource availability and ecosystem function in a particular region.**

|   |                           |   |
|---|---------------------------|---|
| <p>NRS.01.01.01.b. Assess the characteristics of a natural resource to determine its classification.</p>  | <p>Exam</p>               | <p>AFNR Career Cluster, Statement 1<br/>                     AFNR Career Cluster, Statement 2<br/>                     AFNR Career Cluster - Natural Resources Systems Pathway, Statement 3<br/>                     STEM Career Cluster, Statement 1<br/>                     CCSS.ELA-LITERACY.RST.11-12.1<br/>                     CCSS.ELA-LITERACY.RST.11-12.8<br/>                     CCSS.ELA-LITERACY.WHST.9-10.2<br/>                     CCSS.ELA-LITERACY.WHST.11-12.2<br/>                     CCSS.ELA-LITERACY.WHST.9-10.9<br/>                     CCSS.ELA-LITERACY.WHST.11-12.9</p> |
| <p>NRS.01.01.01.c. Devise strategies for the preservation of natural resources based on their classification.</p>   | <p>Team Activity</p>      | <p>AFNR Career Cluster, Statement 1<br/>                     AFNR Career Cluster, Statement 2<br/>                     AFNR Career Cluster - Natural Resources Systems Pathway, Statement 3<br/>                     STEM Career Cluster, Statement 1<br/>                     CCSS.ELA-LITERACY.RST.11-12.1<br/>                     CCSS.ELA-LITERACY.RST.11-12.8<br/>                     CCSS.ELA-LITERACY.WHST.9-10.2<br/>                     CCSS.ELA-LITERACY.WHST.11-12.2<br/>                     CCSS.ELA-LITERACY.WHST.9-10.9<br/>                     CCSS.ELA-LITERACY.WHST.11-12.9</p> |
| <p>NRS.01.01.02.b. Analyze the interdependence of organisms within an ecosystem (e.g., food webs, niches, impact of keystone species, etc.) and assess the dependence of organisms on nonliving components (climate, geography, energy flow, nutrient cycling, etc.).</p> | <p>Exam</p>               | <p>AFNR Career Cluster, Statement 1<br/>                     AFNR Career Cluster, Statement 2<br/>                     AFNR Career Cluster - Natural Resources Systems Pathway, Statement 3<br/>                     STEM Career Cluster, Statement 1<br/>                     CCSS.ELA-LITERACY.RST.11-12.1<br/>                     CCSS.ELA-LITERACY.RST.11-12.8<br/>                     CCSS.ELA-LITERACY.WHST.9-10.2<br/>                     CCSS.ELA-LITERACY.WHST.11-12.2<br/>                     CCSS.ELA-LITERACY.WHST.9-10.9<br/>                     CCSS.ELA-LITERACY.WHST.11-12.9</p> |
| <p>NRS.01.01.02.c. Conduct analyses of ecosystems and document the interactions of living species and non-living resources. Team A<br/>                     NRS.01.01.03.a. Summarize and classify different kinds of living species based on evolutionary traits.</p>    | <p>Exam Team Activity</p> | <p>AFNR Career Cluster, Statement 1<br/>                     AFNR Career Cluster, Statement 2<br/>                     AFNR Career Cluster - Natural Resources Systems Pathway, Statement 3<br/>                     STEM Career Cluster, Statement 1<br/>                     CCSS.ELA-LITERACY.RST.11-12.1<br/>                     CCSS.ELA-LITERACY.RST.11-12.8<br/>                     CCSS.ELA-LITERACY.WHST.9-10.2<br/>                     CCSS.ELA-LITERACY.WHST.11-12.2<br/>                     CCSS.ELA-LITERACY.WHST.9-10.9<br/>                     CCSS.ELA-LITERACY.WHST.11-12.9</p> |

|  |                       |  |
|--|-----------------------|--|
| <p>NRS.01.01.03.b. Analyze how biodiversity develops through evolution, natural selection and adaptation; assess the importance of biodiversity to ecosystem function and availability of natural resources.</p> | <p>Exam</p>           | <p>AFNR Career Cluster, Statement 1<br/>                     AFNR Career Cluster, Statement 2<br/>                     AFNR Career Cluster - Natural Resources Systems Pathway, Statement 3<br/>                     STEM Career Cluster, Statement 1<br/>                     CCSS.ELA-LITERACY.RST.11-12.1<br/>                     CCSS.ELA-LITERACY.RST.11-12.8<br/>                     CCSS.ELA-LITERACY.WHST.9-10.2<br/>                     CCSS.ELA-LITERACY.WHST.11-12.2<br/>                     CCSS.ELA-LITERACY.WHST.9-10.9<br/>                     CCSS.ELA-LITERACY.WHST.11-12.9</p>  |
| <p>NRS.01.01.03.c. Evaluate biodiversity in ecosystems and devise strategies to enhance the function of an ecosystem and the availability of natural resources by increasing the level of biodiversity.</p>      | <p>Team Activity</p>  | <p>AFNR Career Cluster, Statement 1<br/>                     AFNR Career Cluster, Statement 2<br/>                     AFNR Career Cluster - Natural Resources Systems Pathway, Statement 3<br/>                     STEM Career Cluster, Statement 1<br/>                     CCSS.ELA-LITERACY.RST.11-12.1<br/>                     CCSS.ELA-LITERACY.RST.11-12.8<br/>                     CCSS.ELA-LITERACY.WHST.9-10.2<br/>                     CCSS.ELA-LITERACY.WHST.11-12.2<br/>                     CCSS.ELA-LITERACY.WHST.9-10.9<br/>                     CCSS.ELA-LITERACY.WHST.11-12.9</p>  |
| <p><b>NRS.01.02. Performance Indicator: Classify different types of natural resources in order to enable protection, conservation, enhancement and management in a particular geographical region.</b></p>       |                       |  |
| <p>NRS.01.02.01.b. Apply identification techniques to determine the species of a tree or woody plant.</p>  | <p>Identification</p> | <p>AFNR Career Cluster - Natural Resources Systems Pathway, Statement 3<br/>                     CCSS.ELA-LITERACY.RST.11-12.1<br/>                     CCSS.ELA-LITERACY.RST.11-12.7<br/>                     CCSS.ELA-LITERACY.RST.11-12.8<br/>                     CCSS.ELA-LITERACY.WHST.9-10.2<br/>                     CCSS.ELA-LITERACY.WHST.11-12.2<br/>                     CCSS.ELA-LITERACY.WHST.9-10.7<br/>                     CCSS.ELA-LITERACY.WHST.11-12.7<br/>                     CCSS.ELA-LITERACY.WHST.9-10.9<br/>                     CCSS.ELA-LITERACY.WHST.11-12.9<br/>                     CCSS.MATH.CONTENT.HSN-Q.A.1<br/>                     CCSS.MATH.CONTENT.HSN-Q.A.2<br/>                     HS-ESS3-2</p> |
| <p>NRS.01.02.02.b. Apply identification techniques to determine the species of an herbaceous plant.</p>  | <p>Identification</p> | <p>AFNR Career Cluster - Natural Resources Systems Pathway, Statement 3<br/>                     CCSS.ELA-LITERACY.RST.11-12.1<br/>                     CCSS.ELA-LITERACY.RST.11-12.7<br/>                     CCSS.ELA-LITERACY.RST.11-12.8<br/>                     CCSS.ELA-LITERACY.WHST.9-10.2<br/>                     CCSS.ELA-LITERACY.WHST.11-12.2<br/>                     CCSS.ELA-LITERACY.WHST.9-10.7<br/>                     CCSS.ELA-LITERACY.WHST.11-12.7</p>   |



|   |                       |  |
|---|-----------------------|--|
|   |                       | <p>CCSS.ELA-LITERACY.WHST.9-10.9<br/>                 CCSS.ELA-LITERACY.WHST.11-12.9<br/>                 CCSS.MATH.CONTENT.HSN-Q.A.1<br/>                 CCSS.MATH.CONTENT.HSN-Q.A.2<br/>                 HS-ESS3-2</p>  |
| <p>NRS.01.02.03.b. Apply identification techniques to determine the species of wildlife or insect.</p>            | <p>Identification</p> | <p>AFNR Career Cluster - Natural Resources Systems Pathway, Statement 3<br/>                 CCSS.ELA-LITERACY.RST.11-12.1<br/>                 CCSS.ELA-LITERACY.RST.11-12.7<br/>                 CCSS.ELA-LITERACY.RST.11-12.8<br/>                 CCSS.ELA-LITERACY.WHST.9-10.2<br/>                 CCSS.ELA-LITERACY.WHST.11-12.2<br/>                 CCSS.ELA-LITERACY.WHST.9-10.7<br/>                 CCSS.ELA-LITERACY.WHST.11-12.7<br/>                 CCSS.ELA-LITERACY.WHST.9-10.9<br/>                 CCSS.ELA-LITERACY.WHST.11-12.9<br/>                 CCSS.MATH.CONTENT.HSN-Q.A.1<br/>                 CCSS.MATH.CONTENT.HSN-Q.A.2<br/>                 HS-ESS3-2</p> |
| <p>NRS.01.02.04.b. Apply identification techniques to determine the species of an aquatic organism.</p>           | <p>Identification</p> | <p>AFNR Career Cluster - Natural Resources Systems Pathway, Statement 3<br/>                 CCSS.ELA-LITERACY.RST.11-12.1<br/>                 CCSS.ELA-LITERACY.RST.11-12.7<br/>                 CCSS.ELA-LITERACY.RST.11-12.8<br/>                 CCSS.ELA-LITERACY.WHST.9-10.2<br/>                 CCSS.ELA-LITERACY.WHST.11-12.2<br/>                 CCSS.ELA-LITERACY.WHST.9-10.7<br/>                 CCSS.ELA-LITERACY.WHST.11-12.7<br/>                 CCSS.ELA-LITERACY.WHST.9-10.9<br/>                 CCSS.ELA-LITERACY.WHST.11-12.9<br/>                 CCSS.MATH.CONTENT.HSN-Q.A.1<br/>                 CCSS.MATH.CONTENT.HSN-Q.A.2<br/>                 HS-ESS3-2</p> |
| <p>NRS.01.02.05.b. Apply identification techniques to determine the types of non-living resources in an area.</p> | <p>Identification</p> | <p>AFNR Career Cluster - Natural Resources Systems Pathway, Statement 3<br/>                 CCSS.ELA-LITERACY.RST.11-12.1<br/>                 CCSS.ELA-LITERACY.RST.11-12.7<br/>                 CCSS.ELA-LITERACY.RST.11-12.8<br/>                 CCSS.ELA-LITERACY.WHST.9-10.2<br/>                 CCSS.ELA-LITERACY.WHST.11-12.2<br/>                 CCSS.ELA-LITERACY.WHST.9-10.7<br/>                 CCSS.ELA-LITERACY.WHST.11-12.7<br/>                 CCSS.ELA-LITERACY.WHST.9-10.9<br/>                 CCSS.ELA-LITERACY.WHST.11-12.9<br/>                 CCSS.MATH.CONTENT.HSN-Q.A.1<br/>                 CCSS.MATH.CONTENT.HSN-Q.A.2<br/>                 HS-ESS3-2</p> |

**NRS.01.03. Performance Indicator: Apply ecological concepts and principles to atmospheric natural resource systems.**

|  |                      |   |
|--|----------------------|---|
| <p>NRS.01.03.02.b. Analyze the impact that climate has on natural resources and how this impact has changed due to human activity.</p>       | <p>Team Activity</p> | <p>AFNR Career Cluster - Natural Resources Systems Pathway, Statement 3<br/>                 CCSS.ELA-LITERACY.RST.11-12.1<br/>                 CCSS.ELA-LITERACY.RST.11-12.7<br/>                 CCSS.ELA-LITERACY.RST.11-12.8<br/>                 CCSS.MATH.CONTENT.HSN-Q.A.1<br/>                 CCSS.MATH.CONTENT.HSN-Q.A.2<br/>                 CCSS.MATH.CONTENT.HSN-Q.A.3<br/>                 CCSS.MATH.CONTENT.HSS-ID.A.1<br/>                 CCSS.MATH.CONTENT.HSS-IC.A.1<br/>                 CCSS.MATH.CONTENT.HSS-IC.B.6<br/>                 HS-ESS2-4<br/>                 HS-ESS2-6<br/>                 HS-ESS3-4<br/>                 HS-ESS3-5</p> |
| <p>NRS.01.03.02.c. Identify the primary causes of climate change and design strategies to lessen its impact on natural resource systems.</p> | <p>Exam</p>          | <p>AFNR Career Cluster - Natural Resources Systems Pathway, Statement 3<br/>                 CCSS.ELA-LITERACY.RST.11-12.1<br/>                 CCSS.ELA-LITERACY.RST.11-12.7<br/>                 CCSS.ELA-LITERACY.RST.11-12.8<br/>                 CCSS.MATH.CONTENT.HSN-Q.A.1<br/>                 CCSS.MATH.CONTENT.HSN-Q.A.2<br/>                 CCSS.MATH.CONTENT.HSN-Q.A.3<br/>                 CCSS.MATH.CONTENT.HSS-ID.A.1<br/>                 CCSS.MATH.CONTENT.HSS-IC.A.1<br/>                 CCSS.MATH.CONTENT.HSS-IC.B.6<br/>                 HS-ESS2-4<br/>                 HS-ESS2-6<br/>                 HS-ESS3-4<br/>                 HS-ESS3-5</p> |

**NRS.01.04. Performance Indicator: Apply ecological concepts and principles to aquatic natural resource systems.**

|   |                   |   |
|---|-------------------|---|
| <p>NRS.01.04.01.b. Assess the function of watersheds and their effect on natural resources.</p> | <p>Team Soils</p> | <p>AFNR Career Cluster - Natural Resources Systems Pathway, Statement 3<br/>                 CCSS.ELA-LITERACY.RST.11-12.1<br/>                 CCSS.ELA-LITERACY.RST.11-12.7<br/>                 CCSS.ELA-LITERACY.RST.11-12.8<br/>                 CCSS.MATH.CONTENT.HSN-Q.A.1<br/>                 CCSS.MATH.CONTENT.HSN-Q.A.2<br/>                 CCSS.MATH.CONTENT.HSN-Q.A.3<br/>                 CCSS.MATH.CONTENT.HSS-ID.A.1<br/>                 CCSS.MATH.CONTENT.HSS-IC.A.1<br/>                 CCSS.MATH.CONTENT.HSS-IC.B.6<br/>                 HS-ESS2-4<br/>                 HS-ESS2-6<br/>                 HS-ESS3-4<br/>                 HS-ESS3-5</p> |
|---|-------------------|---|

|  |                      |   |
|--|----------------------|---|
| <p>NRS.01.04.01.c. Evaluate and defend the importance of watersheds to ecosystem function.</p>   | <p>Team Soils</p>    | <p>AFNR Career Cluster - Natural Resources Systems Pathway, Statement 3<br/>                     CCSS.ELA-LITERACY.RST.11-12.1<br/>                     CCSS.ELA-LITERACY.RST.11-12.7<br/>                     CCSS.ELA-LITERACY.RST.11-12.8<br/>                     CCSS.MATH.CONTENT.HSN-Q.A.1<br/>                     CCSS.MATH.CONTENT.HSN-Q.A.2<br/>                     CCSS.MATH.CONTENT.HSN-Q.A.3<br/>                     CCSS.MATH.CONTENT.HSS-ID.A.1<br/>                     CCSS.MATH.CONTENT.HSS-IC.A.1<br/>                     CCSS.MATH.CONTENT.HSS-IC.B.6<br/>                     HS-ESS2-4<br/>                     HS-ESS2-6<br/>                     HS-ESS3-4<br/>                     HS-ESS3-5</p> |
| <p>NRS.01.04.02.c. Devise strategies to manage, protect, enhance or improve sources of groundwater or surface water based on its properties.</p> | <p>Team Activity</p> | <p>AFNR Career Cluster - Natural Resources Systems Pathway, Statement 3<br/>                     CCSS.ELA-LITERACY.RST.11-12.1<br/>                     CCSS.ELA-LITERACY.RST.11-12.7<br/>                     CCSS.ELA-LITERACY.RST.11-12.8<br/>                     CCSS.MATH.CONTENT.HSN-Q.A.1<br/>                     CCSS.MATH.CONTENT.HSN-Q.A.2<br/>                     CCSS.MATH.CONTENT.HSN-Q.A.3<br/>                     CCSS.MATH.CONTENT.HSS-ID.A.1<br/>                     CCSS.MATH.CONTENT.HSS-IC.A.1<br/>                     CCSS.MATH.CONTENT.HSS-IC.B.6<br/>                     HS-ESS2-4<br/>                     HS-ESS2-6<br/>                     HS-ESS3-4<br/>                     HS-ESS3-5</p> |
| <p>NRS.01.04.03.b. Asses techniques used in the creation, enhancement and management of riparian zones and riparian buffers. Soils analysis,</p> | <p>Team Activity</p> | <p>AFNR Career Cluster - Natural Resources Systems Pathway, Statement 3<br/>                     CCSS.ELA-LITERACY.RST.11-12.1<br/>                     CCSS.ELA-LITERACY.RST.11-12.7<br/>                     CCSS.ELA-LITERACY.RST.11-12.8<br/>                     CCSS.MATH.CONTENT.HSN-Q.A.1<br/>                     CCSS.MATH.CONTENT.HSN-Q.A.2<br/>                     CCSS.MATH.CONTENT.HSN-Q.A.3<br/>                     CCSS.MATH.CONTENT.HSS-ID.A.1<br/>                     CCSS.MATH.CONTENT.HSS-IC.A.1<br/>                     CCSS.MATH.CONTENT.HSS-IC.B.6<br/>                     HS-ESS2-4<br/>                     HS-ESS2-6<br/>                     HS-ESS3-4<br/>                     HS-ESS3-5</p> |

|  |                            |   |
|--|----------------------------|---|
| <p>NRS.01.04.03.c. Devise strategies for the creation, enhancement and management of riparian zones and riparian buffers.</p>  | <p>Team Activity</p>       | <p>AFNR Career Cluster - Natural Resources Systems Pathway, Statement 3<br/>                     CCSS.ELA-LITERACY.RST.11-12.1<br/>                     CCSS.ELA-LITERACY.RST.11-12.7<br/>                     CCSS.ELA-LITERACY.RST.11-12.8<br/>                     CCSS.MATH.CONTENT.HSN-Q.A.1<br/>                     CCSS.MATH.CONTENT.HSN-Q.A.2<br/>                     CCSS.MATH.CONTENT.HSN-Q.A.3<br/>                     CCSS.MATH.CONTENT.HSS-ID.A.1<br/>                     CCSS.MATH.CONTENT.HSS-IC.A.1<br/>                     CCSS.MATH.CONTENT.HSS-IC.B.6<br/>                     HS-ESS2-4<br/>                     HS-ESS2-6<br/>                     HS-ESS3-4<br/>                     HS-ESS3-5</p> |
| <p><b>NRS.01.05. Performance Indicator: Apply ecological concepts and principles to terrestrial natural resource systems.</b></p>  |                            |   |
| <p>NRS.01.05.01.b. Analyze and summarize examples of stages of succession.</p>   | <p>Team Activity, Exam</p> | <p>AFNR Career Cluster, Statement 1<br/>                     AFNR Career Cluster – Animal Systems Pathway, Statement 3<br/>                     AFNR Career Cluster – Natural Resources Systems Pathway, Statement 3<br/>                     CCSS.ELA-LITERACY.RST.11-12.1<br/>                     CCSS.ELA-LITERACY.RST.11-12.7<br/>                     CCSS.ELA-LITERACY.RST.11-12.8<br/>                     CCSS.MATH.CONTENT.HSS-ID.A.1<br/>                     CCSS.MATH.CONTENT.HSS-IC.A.1<br/>                     CCSS.MATH.CONTENT.HSS-IC.B.6<br/>                     HS-ESS3-4<br/>                     HS-ESS3-2</p>   |
| <p>NRS.01.05.01.c. Evaluate the stages of succession present in an ecosystem and predict which species will become more prevalent through future stages of succession.</p> | <p>Team Activity</p>       | <p>AFNR Career Cluster, Statement 1<br/>                     AFNR Career Cluster – Animal Systems Pathway, Statement 3<br/>                     AFNR Career Cluster – Natural Resources Systems Pathway, Statement 3<br/>                     CCSS.ELA-LITERACY.RST.11-12.1<br/>                     CCSS.ELA-LITERACY.RST.11-12.7<br/>                     CCSS.ELA-LITERACY.RST.11-12.8<br/>                     CCSS.MATH.CONTENT.HSS-ID.A.1<br/>                     CCSS.MATH.CONTENT.HSS-IC.A.1<br/>                     CCSS.MATH.CONTENT.HSS-IC.B.6<br/>                     HS-ESS3-4<br/>                     HS-ESS3-2</p>   |
| <p>NRS.01.05.02.b. Analyze and summarize examples of habitat disturbances and habitat resilience.</p>  | <p>Team Activity</p>       | <p>AFNR Career Cluster, Statement 1<br/>                     AFNR Career Cluster – Animal Systems Pathway, Statement 3<br/>                     AFNR Career Cluster – Natural Resources Systems Pathway, Statement 3<br/>                     CCSS.ELA-LITERACY.RST.11-12.1<br/>                     CCSS.ELA-LITERACY.RST.11-12.7<br/>                     CCSS.ELA-LITERACY.RST.11-12.8</p>   |

|   |                                      |   |
|---|--------------------------------------|---|
|   |                                      | <p>CCSS.MATH.CONTENT.HSS-ID.A.1<br/>                 CCSS.MATH.CONTENT.HSS-IC.A.1<br/>                 CCSS.MATH.CONTENT.HSS-IC.B.6<br/>                 HS-ESS3-4<br/>                 HS-ESS3-2</p>   |
| <p>NRS.01.05.02.c. Interpret signs of habitat disturbances and resilience in an ecosystem and use these signs to assess the health of an ecosystem.</p>   | <p>Team Activity</p>                 | <p>AFNR Career Cluster, Statement 1<br/>                 AFNR Career Cluster – Animal Systems Pathway, Statement 3<br/>                 AFNR Career Cluster – Natural Resources Systems Pathway, Statement 3<br/>                 CCSS.ELA-LITERACY.RST.11-12.1<br/>                 CCSS.ELA-LITERACY.RST.11-12.7<br/>                 CCSS.ELA-LITERACY.RST.11-12.8<br/>                 CCSS.MATH.CONTENT.HSS-ID.A.1<br/>                 CCSS.MATH.CONTENT.HSS-IC.A.1<br/>                 CCSS.MATH.CONTENT.HSS-IC.B.6<br/>                 HS-ESS3-4<br/>                 HS-ESS3-2</p> |
| <p>NRS.01.05.03.c. Devise a forest management plan that improves the habitat while sustainably maximizing the amount of timber that can be harvested.</p> | <p>Team Activity</p>                 | <p>AFNR Career Cluster, Statement 1<br/>                 AFNR Career Cluster – Animal Systems Pathway, Statement 3<br/>                 AFNR Career Cluster – Natural Resources Systems Pathway, Statement 3<br/>                 CCSS.ELA-LITERACY.RST.11-12.1<br/>                 CCSS.ELA-LITERACY.RST.11-12.7<br/>                 CCSS.ELA-LITERACY.RST.11-12.8<br/>                 CCSS.MATH.CONTENT.HSS-ID.A.1<br/>                 CCSS.MATH.CONTENT.HSS-IC.A.1<br/>                 CCSS.MATH.CONTENT.HSS-IC.B.6<br/>                 HS-ESS3-4<br/>                 HS-ESS3-2</p> |
| <p>NRS.01.05.04.b. Analyze a plot of land in order to determine which soil management techniques would be most applicable.</p>                            | <p>Team Activity, Soils Analysis</p> | <p>AFNR Career Cluster, Statement 1<br/>                 AFNR Career Cluster – Animal Systems Pathway, Statement 3<br/>                 AFNR Career Cluster – Natural Resources Systems Pathway, Statement 3<br/>                 CCSS.ELA-LITERACY.RST.11-12.1<br/>                 CCSS.ELA-LITERACY.RST.11-12.7<br/>                 CCSS.ELA-LITERACY.RST.11-12.8<br/>                 CCSS.MATH.CONTENT.HSS-ID.A.1<br/>                 CCSS.MATH.CONTENT.HSS-IC.A.1<br/>                 CCSS.MATH.CONTENT.HSS-IC.B.6<br/>                 HS-ESS3-4<br/>                 HS-ESS3-2</p> |
| <p>NRS.01.05.04.c. Devise a soil management plan to minimize erosion and maximize biodiversity, plant productivity, and the formation of topsoil.</p>     | <p>Team Activity, Soils Analysis</p> | <p>AFNR Career Cluster, Statement 1<br/>                 AFNR Career Cluster – Animal Systems Pathway, Statement 3<br/>                 AFNR Career Cluster – Natural Resources Systems Pathway, Statement 3<br/>                 CCSS.ELA-LITERACY.RST.11-12.1<br/>                 CCSS.ELA-LITERACY.RST.11-12.7</p>  |

|   |                      |   |
|---|----------------------|---|
|   |                      | <p>CCSS.ELA-LITERACY.RST.11-12.8<br/>                 CCSS.MATH.CONTENT.HSS-ID.A.1<br/>                 CCSS.MATH.CONTENT.HSS-IC.A.1<br/>                 CCSS.MATH.CONTENT.HSS-IC.B.6<br/>                 HS-ESS3-4<br/>                 HS-ESS3-2</p>  |
| <p><b>NRS.01.06. Performance Indicator: Apply ecological concepts and principles to living organisms in natural resource systems.</b></p>   |                      |   |
| <p>NRS.01.06.01.c. Create a management plan for a population of a species in an ecosystem given its population ecology, population density and population dispersion.</p>                               | <p>Team Activity</p> | <p>AFNR Career Cluster, Statement 1<br/>                 AFNR Career Cluster – Animal Systems Pathway, Statement 3<br/>                 AFNR Career Cluster – Natural Resources Systems Pathway, Statement 3<br/>                 CCSS.ELA-LITERACY.RST.11-12.1<br/>                 CCSS.ELA-LITERACY.RST.11-12.8<br/>                 CCSS.ELA-LITERACY.WHST.9-10.2<br/>                 CCSS.ELA-LITERACY.WHST.11-12.2<br/>                 CCSS.ELA-LITERACY.WHST.9-10.5<br/>                 CCSS.ELA-LITERACY.WHST.11-12.5<br/>                 CCSS.ELA-LITERACY.WHST.9-10.7<br/>                 CCSS.ELA-LITERACY.WHST.11-12.7<br/>                 CCSS.ELA-LITERACY.WHST.9-10.9<br/>                 CCSS.ELA-LITERACY.WHST.11-12.9<br/>                 HS-LS4-4<br/>                 HS-LS4-6<br/>                 HS-ESS3-4</p> |
| <p>NRS.01.06.02.b. Analyze factors that influence the establishment and spread of invasive species and determine the appropriate steps to prevent or minimize the impact of invasive species.</p>       | <p>Team Activity</p> | <p>AFNR Career Cluster, Statement 1<br/>                 AFNR Career Cluster – Animal Systems Pathway, Statement 3<br/>                 AFNR Career Cluster – Natural Resources Systems Pathway, Statement 3<br/>                 CCSS.ELA-LITERACY.RST.11-12.1<br/>                 CCSS.ELA-LITERACY.RST.11-12.8<br/>                 CCSS.ELA-LITERACY.WHST.9-10.2<br/>                 CCSS.ELA-LITERACY.WHST.11-12.2<br/>                 CCSS.ELA-LITERACY.WHST.9-10.5<br/>                 CCSS.ELA-LITERACY.WHST.11-12.5<br/>                 CCSS.ELA-LITERACY.WHST.9-10.7<br/>                 CCSS.ELA-LITERACY.WHST.11-12.7<br/>                 CCSS.ELA-LITERACY.WHST.9-10.9<br/>                 CCSS.ELA-LITERACY.WHST.11-12.9<br/>                 HS-LS4-4<br/>                 HS-LS4-6<br/>                 HS-ESS3-4</p> |
| <p>NRS.01.06.02.c. Evaluate the presence and impact of invasive species on natural resources in a given area and devise a plan to prevent, control or eliminate invasive species from that habitat.</p> | <p>Team Activity</p> | <p>AFNR Career Cluster, Statement 1<br/>                 AFNR Career Cluster – Animal Systems Pathway, Statement 3<br/>                 AFNR Career Cluster – Natural Resources Systems Pathway, Statement 3<br/>                 CCSS.ELA-LITERACY.RST.11-12.1<br/>                 CCSS.ELA-LITERACY.RST.11-12.8</p>  |

|  |  |   |
|--|--|---|
|  |  | CCSS.ELA-LITERACY.WHST.9-10.2<br>CCSS.ELA-LITERACY.WHST.11-12.2<br>CCSS.ELA-LITERACY.WHST.9-10.5<br>CCSS.ELA-LITERACY.WHST.11-12.5<br>CCSS.ELA-LITERACY.WHST.9-10.7<br>CCSS.ELA-LITERACY.WHST.11-12.7<br>CCSS.ELA-LITERACY.WHST.9-10.9<br>CCSS.ELA-LITERACY.WHST.11-12.9<br>HS-LS4-4<br>HS-LS4-6<br>HS-ESS3-4 |
|--|--|---|

**NRS.02.01. Performance Indicator: Examine and interpret the purpose, impact and effectiveness of laws and agencies related to natural resource management, protection, enhancement and improvement.**

|   |               |   |
|---|---------------|---|
| NRS.02.01.02.b. Analyze the specific purpose of agencies associated with natural resources systems. | Team Activity | AFNR Career Cluster, Statement 2<br>AFNR Career Cluster – Agribusiness Systems Pathway, Statement 1<br>AFNR Career Cluster – Natural Resources Systems Pathway, Statement 2<br>STEM Career Cluster, Statement 3 |
|---|---------------|---|

|  |               |   |
|--|---------------|---|
| NRS.02.01.02.c. Evaluate the impact and effectiveness of agencies associated with natural resources systems (e.g., regulation of consumption, prevention of damage to natural resources systems, management of ecological interactions, etc.). | Team Activity | AFNR Career Cluster, Statement 2<br>AFNR Career Cluster – Agribusiness Systems Pathway, Statement 1<br>AFNR Career Cluster – Natural Resources Systems Pathway, Statement 2<br>STEM Career Cluster, Statement 3 |
|--|---------------|---|

**NRS.02.02. Performance Indicator: Assess the impact of human activities on the availability of natural resources.**

|  |               |   |
|--|---------------|---|
| NRS.02.02.01.b. Assess how different kinds of human activity affect the use and availability of natural resources (i.e., agriculture, industry, transportation, etc.). | Team Activity | AFNR Career Cluster – Animal Systems Pathway, Statement 1<br>STEM Career Cluster, Statement 2<br>CCSS.ELA-LITERACY.RST.11-12.1<br>CCSS.ELA-LITERACY.RST.11-12.2<br>CCSS.ELA-LITERACY.RST.11-12.7<br>CCSS.ELA-LITERACY.RST.11-12.8<br>CCSS.ELA-LITERACY.WHST.9-10.2<br>CCSS.ELA-LITERACY.WHST.11-12.2<br>CCSS.ELA-LITERACY.WHST.9-10.7<br>CCSS.ELA-LITERACY.WHST.11-12.7<br>CCSS.MATH.CONTENT.HSN-Q.A.1<br>CCSS.MATH.CONTENT.HSN-Q.A.2<br>CCSS.MATH.CONTENT.HSN-Q.A.3<br>HS-LS2-7<br>HS-ESS3-2<br>HS-ESS3-3<br>HS-ESS3-4<br>HS-ESS3-5<br>HS-ESS3-6 |
|--|---------------|---|

|  |                      |  |
|--|----------------------|--|
| <p>NRS.02.02.01.c. Evaluate how the availability of natural resources can be improved through changes to human activity.</p>   | <p>Team Activity</p> | <p>AFNR Career Cluster – Animal Systems Pathway, Statement 1<br/>                     STEM Career Cluster, Statement 2<br/>                     CCSS.ELA-LITERACY.RST.11-12.1<br/>                     CCSS.ELA-LITERACY.RST.11-12.2<br/>                     CCSS.ELA-LITERACY.RST.11-12.7<br/>                     CCSS.ELA-LITERACY.RST.11-12.8<br/>                     CCSS.ELA-LITERACY.WHST.9-10.2<br/>                     CCSS.ELA-LITERACY.WHST.11-12.2<br/>                     CCSS.ELA-LITERACY.WHST.9-10.7<br/>                     CCSS.ELA-LITERACY.WHST.11-12.7<br/>                     CCSS.MATH.CONTENT.HSN-Q.A.1<br/>                     CCSS.MATH.CONTENT.HSN-Q.A.2<br/>                     CCSS.MATH.CONTENT.HSN-Q.A.3<br/>                     HS-LS2-7<br/>                     HS-ESS3-2<br/>                     HS-ESS3-3<br/>                     HS-ESS3-4<br/>                     HS-ESS3-5<br/>                     HS-ESS3-6</p> |
| <p>NRS.02.02.02.b. Assess causes of extinction and how those causes related to loss of biodiversity.</p>   | <p>Team Activity</p> | <p>AFNR Career Cluster – Animal Systems Pathway, Statement 1<br/>                     STEM Career Cluster, Statement 2<br/>                     CCSS.ELA-LITERACY.RST.11-12.1<br/>                     CCSS.ELA-LITERACY.RST.11-12.2<br/>                     CCSS.ELA-LITERACY.RST.11-12.7<br/>                     CCSS.ELA-LITERACY.RST.11-12.8<br/>                     CCSS.ELA-LITERACY.WHST.9-10.2<br/>                     CCSS.ELA-LITERACY.WHST.11-12.2<br/>                     CCSS.ELA-LITERACY.WHST.9-10.7<br/>                     CCSS.ELA-LITERACY.WHST.11-12.7<br/>                     CCSS.MATH.CONTENT.HSN-Q.A.1<br/>                     CCSS.MATH.CONTENT.HSN-Q.A.2<br/>                     CCSS.MATH.CONTENT.HSN-Q.A.3<br/>                     HS-LS2-7<br/>                     HS-ESS3-2<br/>                     HS-ESS3-3<br/>                     HS-ESS3-4<br/>                     HS-ESS3-5<br/>                     HS-ESS3-6</p> |
| <p>NRS.02.02.02.c. Devise a strategy for preventing the loss of species and biodiversity that takes into account the primary causes of species extinction from human activity.</p> | <p>Team Activity</p> | <p>AFNR Career Cluster – Animal Systems Pathway, Statement 1<br/>                     STEM Career Cluster, Statement 2<br/>                     CCSS.ELA-LITERACY.RST.11-12.1<br/>                     CCSS.ELA-LITERACY.RST.11-12.2<br/>                     CCSS.ELA-LITERACY.RST.11-12.7<br/>                     CCSS.ELA-LITERACY.RST.11-12.8<br/>                     CCSS.ELA-LITERACY.WHST.9-10.2<br/>                     CCSS.ELA-LITERACY.WHST.11-12.2<br/>                     CCSS.ELA-LITERACY.WHST.9-10.7<br/>                     CCSS.ELA-LITERACY.WHST.11-12.7</p>   |



|  |                      |  |
|--|----------------------|--|
|  |                      | <p>CCSS.MATH.CONTENT.HSN-Q.A.1<br/>                 CCSS.MATH.CONTENT.HSN-Q.A.2<br/>                 CCSS.MATH.CONTENT.HSN-Q.A.3<br/>                 HS-LS2-7<br/>                 HS-ESS3-2<br/>                 HS-ESS3-3<br/>                 HS-ESS3-4<br/>                 HS-ESS3-5<br/>                 HS-ESS3-6</p>  |
| <p>NRS.02.02.03.b. Identify solutions to improve the sustainability of modern lifestyles.</p>  | <p>Team Activity</p> | <p>AFNR Career Cluster – Animal Systems Pathway, Statement 1<br/>                 STEM Career Cluster, Statement 2<br/>                 CCSS.ELA-LITERACY.RST.11-12.1<br/>                 CCSS.ELA-LITERACY.RST.11-12.2<br/>                 CCSS.ELA-LITERACY.RST.11-12.7<br/>                 CCSS.ELA-LITERACY.RST.11-12.8<br/>                 CCSS.ELA-LITERACY.WHST.9-10.2<br/>                 CCSS.ELA-LITERACY.WHST.11-12.2<br/>                 CCSS.ELA-LITERACY.WHST.9-10.7<br/>                 CCSS.ELA-LITERACY.WHST.11-12.7<br/>                 CCSS.MATH.CONTENT.HSN-Q.A.1<br/>                 CCSS.MATH.CONTENT.HSN-Q.A.2<br/>                 CCSS.MATH.CONTENT.HSN-Q.A.3<br/>                 HS-LS2-7<br/>                 HS-ESS3-2<br/>                 HS-ESS3-3<br/>                 HS-ESS3-4<br/>                 HS-ESS3-5<br/>                 HS-ESS3-6</p> |
| <p>NRS.02.02.03.c. Evaluate how modern lifestyles affect resource consumption and energy use and devise a strategy to prevent the complete loss of a natural resource.</p> | <p>Team Activity</p> | <p>AFNR Career Cluster – Animal Systems Pathway, Statement 1<br/>                 STEM Career Cluster, Statement 2<br/>                 CCSS.ELA-LITERACY.RST.11-12.1<br/>                 CCSS.ELA-LITERACY.RST.11-12.2<br/>                 CCSS.ELA-LITERACY.RST.11-12.7<br/>                 CCSS.ELA-LITERACY.RST.11-12.8<br/>                 CCSS.ELA-LITERACY.WHST.9-10.2<br/>                 CCSS.ELA-LITERACY.WHST.11-12.2<br/>                 CCSS.ELA-LITERACY.WHST.9-10.7<br/>                 CCSS.ELA-LITERACY.WHST.11-12.7<br/>                 CCSS.MATH.CONTENT.HSN-Q.A.1<br/>                 CCSS.MATH.CONTENT.HSN-Q.A.2<br/>                 CCSS.MATH.CONTENT.HSN-Q.A.3<br/>                 HS-LS2-7<br/>                 HS-ESS3-2<br/>                 HS-ESS3-3<br/>                 HS-ESS3-4<br/>                 HS-ESS3-5<br/>                 HS-ESS3-6</p> |

**NRS.02.03. Performance Indicator: Analyze how modern perceptions of natural resource management, protection, enhancement and improvement change and develop over time.**

|   |  |   |
|---|--|---|
| <p>NRS.02.03.01.b. Analyze how social considerations can affect the use and sustainability of natural resources.</p>  | <p>Team Activity</p>                   | <p>AFNR Career Cluster, Statement 7</p> |
| <p>NRS.02.03.02.b. Examine the relationship between current trends in natural resource systems and historical figures that played a prominent role in shaping how natural resources are viewed and used today.</p>  | <p>Exam</p>                            | <p>AFNR Career Cluster, Statement 7</p> |
| <p>NRS.02.03.03.b. Analyze and document how some technological advancements changed how natural resources were used and viewed (e.g., Industrial Revolution, fossil fuels, green technology, etc.).<br/>Team Activity NRS.02.03.03.c. Anticipate and predict how future technological advancements may affect the use and views of natural resources.</p> | <p>Team Activity, Waste Management</p> | <p>AFNR Career Cluster, Statement 7</p> |

**NRS.02.04. Performance Indicator: Examine and explain how economics affects the use of natural resources.**

|  |                      |   |
|--|----------------------|---|
| <p>NRS.02.04.01.c. Devise a plan to improve the conservation, protection, improvement and enhancement of natural resources based on economic value and practices.</p>        | <p>Team Activity</p> | <p>AFNR Career Cluster, Statement 4<br/>                     AFNR Career Cluster – Agribusiness Systems Pathway, Statement 4<br/>                     AFNR Career Cluster – Natural Resources Systems Pathway, Statement 4<br/>                     AFNR Career Cluster – Plant Systems Pathway, Statement 1<br/>                     CCSS.ELA-LITERACY.RST.11-12.1<br/>                     CCSS.ELA-LITERACY.RST.11-12.8<br/>                     CCSS.ELA-LITERACY.RST.11-12.7<br/>                     CCSS.ELA-LITERACY.WHST.11-12.2<br/>                     CCSS.ELA-LITERACY.WHST.11-12.7<br/>                     CCSS.ELA-LITERACY.WHST.11-12.8<br/>                     CCSS.ELA-LITERACY.WHST.11-12.9<br/>                     CCSS.ELA-LITERACY.SL.11-12.4</p> |
| <p>NRS.02.04.02.c. Anticipate and predict how changes to the availability of natural resources because of human activity may impact a local, state and national economy.</p> | <p>Team Activity</p> | <p>AFNR Career Cluster, Statement 4<br/>                     AFNR Career Cluster – Agribusiness Systems Pathway, Statement 4<br/>                     AFNR Career Cluster – Natural Resources Systems Pathway, Statement 4<br/>                     AFNR Career Cluster – Plant Systems Pathway, Statement 1<br/>                     CCSS.ELA-LITERACY.RST.11-12.1<br/>                     CCSS.ELA-LITERACY.RST.11-12.8</p>  |

|   |               |   |
|---|---------------|---|
|   |               | <p>CCSS.ELA-LITERACY.RST.11-12.7<br/>                 CCSS.ELA-LITERACY.WHST.11-12.2<br/>                 CCSS.ELA-LITERACY.WHST.11-12.7<br/>                 CCSS.ELA-LITERACY.WHST.11-12.8<br/>                 CCSS.ELA-LITERACY.WHST.11-12.9<br/>                 CCSS.ELA-LITERACY.SL.11-12.4</p>  |
| NRS.02.04.03.c. Anticipate and predict the economic impact green technology and alternative energy. | Team Activity | <p>AFNR Career Cluster, Statement 4<br/>                 AFNR Career Cluster – Agribusiness Systems Pathway, Statement 4<br/>                 AFNR Career Cluster – Natural Resources Systems Pathway, Statement 4<br/>                 AFNR Career Cluster – Plant Systems Pathway, Statement 1<br/>                 CCSS.ELA-LITERACY.RST.11-12.1<br/>                 CCSS.ELA-LITERACY.RST.11-12.8<br/>                 CCSS.ELA-LITERACY.RST.11-12.7<br/>                 CCSS.ELA-LITERACY.WHST.11-12.2<br/>                 CCSS.ELA-LITERACY.WHST.11-12.7<br/>                 CCSS.ELA-LITERACY.WHST.11-12.8<br/>                 CCSS.ELA-LITERACY.WHST.11-12.9<br/>                 CCSS.ELA-LITERACY.SL.11-12.4</p> |

**NRS.02.05. Performance Indicator: Communicate information to the public regarding topics related to the management, protection, enhancement, and improvement of natural resources.**

|   |               |   |
|---|---------------|---|
| NRS.02.05.01.c. Devise a strategy for communicating a natural resources message through media.  | Team Activity | <p>AFNR Career Cluster, Statement 2<br/>                 AFNR Career Cluster, Statement 3<br/>                 STEM Career Cluster, Statement 2<br/>                 STEM Career Cluster, Statement 3</p> |
| NRS.02.05.02.c. Anticipate and predict how messages about the conservation, management, enhancement and improvement of natural resources will change because of social media and the Internet.  | Team Activity | <p>AFNR Career Cluster, Statement 2<br/>                 AFNR Career Cluster, Statement 3<br/>                 STEM Career Cluster, Statement 2<br/>                 STEM Career Cluster, Statement 3</p> |
| NRS.02.05.03.c. Create a communication plan to influence the behavior of people, call people to action and instill a sense of civic behavior related to the conservation, management, enhancement and improvement of natural resources. | Team Activity | <p>AFNR Career Cluster, Statement 2<br/>                 AFNR Career Cluster, Statement 3<br/>                 STEM Career Cluster, Statement 2<br/>                 STEM Career Cluster, Statement 3</p> |

**NRS.03.01. Performance Indicator: Sustainably produce, harvest, process and use natural resource products (e.g., forest products, wildlife, minerals, fossil fuels, shale oil, alternative energy, recreation, aquatic species, etc.).**

|   |                      |   |
|---|----------------------|---|
| <p>NRS.03.01.04.b. Assess the economic impact of fossil fuel extraction in regards to the costs and benefits to a local, state and/or national economy.</p>                   | <p>Team Activity</p> | <p>AFNR Career Cluster – Food Products and Processing Systems Pathway, Statement 1<br/> AFNR Career Cluster – Plant Systems Pathway, Statement 4<br/> CCSS.ELA-LITERACY.RST.11-12.8<br/> HS-ESS3-2<br/> HS-ESS3-3</p> |
| <p>NRS.03.01.04.c. Evaluate methods used to extract and process fossil fuels for economic, environmental and social sustainability.</p>                                       | <p>Team Activity</p> | <p>AFNR Career Cluster – Food Products and Processing Systems Pathway, Statement 1<br/> AFNR Career Cluster – Plant Systems Pathway, Statement 4<br/> CCSS.ELA-LITERACY.RST.11-12.8<br/> HS-ESS3-2<br/> HS-ESS3-3</p> |
| <p>NRS.03.01.05.b. Assess the economic impact of shale oil extraction (i.e., fracking) in regards to the costs and benefits to a local, state and/or national economy.</p>    | <p>Team Activity</p> | <p>AFNR Career Cluster – Food Products and Processing Systems Pathway, Statement 1<br/> AFNR Career Cluster – Plant Systems Pathway, Statement 4<br/> CCSS.ELA-LITERACY.RST.11-12.8<br/> HS-ESS3-2<br/> HS-ESS3-3</p> |
| <p>NRS.03.01.05.c. Evaluate methods used to extract and process shale oil for economic, environmental and social sustainability.</p>  | <p>Team Activity</p> | <p>AFNR Career Cluster – Food Products and Processing Systems Pathway, Statement 1<br/> AFNR Career Cluster – Plant Systems Pathway, Statement 4<br/> CCSS.ELA-LITERACY.RST.11-12.8<br/> HS-ESS3-2<br/> HS-ESS3-3</p> |
| <p>NRS.03.01.06.b. Assess and evaluate factors that affect the economic, environmental and social sustainability in regards to the use of alternative sources of energy.</p>  | <p>Team Activity</p> | <p>AFNR Career Cluster – Food Products and Processing Systems Pathway, Statement 1<br/> AFNR Career Cluster – Plant Systems Pathway, Statement 4<br/> CCSS.ELA-LITERACY.RST.11-12.8<br/> HS-ESS3-2<br/> HS-ESS3-3</p> |
| <p>NRS.03.01.06.c. Assess trends in energy production and consumption in order to predict how the impact of alternative energy will change in the future.</p>                 | <p>Team Activity</p> | <p>AFNR Career Cluster – Food Products and Processing Systems Pathway, Statement 1<br/> AFNR Career Cluster – Plant Systems Pathway, Statement 4<br/> CCSS.ELA-LITERACY.RST.11-12.8<br/> HS-ESS3-2<br/> HS-ESS3-3</p> |
| <p>NRS.03.01.07.b. Assess different options for improving the sustainability of outdoor recreation based on its impact on natural resources and likelihood of acceptance.</p> | <p>Team Activity</p> | <p>AFNR Career Cluster – Food Products and Processing Systems Pathway, Statement 1<br/> AFNR Career Cluster – Plant Systems Pathway, Statement 4<br/> CCSS.ELA-LITERACY.RST.11-12.8<br/> HS-ESS3-2<br/> HS-ESS3-3</p> |

|   |                      |   |
|---|----------------------|---|
| <p>NRS.03.01.07.c. Evaluate an example of outdoor recreation and develop suggestions for how that activity can be made more sustainable in a manner that is acceptable to those who take part in that activity.</p> | <p>Team Activity</p> | <p>AFNR Career Cluster – Food Products and Processing Systems Pathway, Statement 1<br/>                     AFNR Career Cluster – Plant Systems Pathway, Statement 4<br/>                     CCSS.ELA-LITERACY.RST.11-12.8<br/>                     HS-ESS3-2<br/>                     HS-ESS3-3</p> |
| <p>NRS.03.01.08.b. Analyze and document techniques used to acquire aquatic species for their environmental, economic and social sustainability.</p>   | <p>Team Activity</p> | <p>AFNR Career Cluster – Food Products and Processing Systems Pathway, Statement 1<br/>                     AFNR Career Cluster – Plant Systems Pathway, Statement 4<br/>                     CCSS.ELA-LITERACY.RST.11-12.8<br/>                     HS-ESS3-2<br/>                     HS-ESS3-3</p> |
| <p>NRS.03.01.08.c. Develop recommendations for the sustainable harvest of aquatic species.</p>  | <p>Team Activity</p> | <p>AFNR Career Cluster – Food Products and Processing Systems Pathway, Statement 1<br/>                     AFNR Career Cluster – Plant Systems Pathway, Statement 4<br/>                     CCSS.ELA-LITERACY.RST.11-12.8<br/>                     HS-ESS3-2<br/>                     HS-ESS3-3</p> |

**NRS.03.02. Performance Indicator: Demonstrate cartographic skills, tools and technologies to aid in developing, implementing and evaluating natural resource management plans.**

|  |   |  |
|--|---|--|
| <p>NRS.03.02.01.b. Apply cartographic skills and tools (e.g., land surveys, geographic coordinate systems, etc.) to locate natural resources.</p>  | <p>Gps</p>  |  |
| <p>NRS.03.02.01.c. Evaluate the availability of and threats to natural resources using cartographic skills (e.g., spread of invasive species, movement of wildlife populations, changes to biodiversity of edge of habitat versus interior, etc.).</p> | <p>Data Analysis, Waste Management, Team Activity</p> |  |
| <p>NRS.03.02.02.b. Analyze how an area’s natural resources could be assessed using GIS technology.</p>   | <p>Gps, Data Analysis</p>                             |  |
| <p>NRS.03.02.02.c. Use GIS data for a given area to devise a management plan for the management, conservation, improvement, and enhancement of its natural resources. Waste Management,</p>  | <p>Team Activity</p>                                  |  |

**NRS.04.01. Performance Indicator: Demonstrate natural resource protection, maintenance, enhancement and improvement techniques.**

|  |                      |   |
|--|----------------------|---|
| <p>NRS.04.01.01.b. Assess indicators of the biological health of a stream.</p> | <p>Exam</p>          | <p>AFNR Career Cluster – Environmental Service Systems Pathway, Statement 3<br/>                     AFNR Career Cluster – Environmental Service Systems Pathway, Statement 4<br/>                     AFNR Career Cluster – Natural Resources Systems Pathway, Statement 2<br/>                     AFNR Career Cluster – Natural Resources Systems Pathway, Statement 5<br/>                     AFNR Career Cluster – Plant Systems Pathway, Statement 2<br/>                     AFNR Career Cluster – Plant Systems Pathway, Statement 3<br/>                     CCSS.ELA-LITERACY.RST.11-12.8<br/>                     CCSS.ELA-LITERACY.SL.11-12.4<br/>                     HS-ESS3-2<br/>                     HS-ESS3-3<br/>                     HS-ESS3-4</p> |
| <p>NRS.04.01.01.c. Create an enhancement plan for a stream.</p>                | <p>Team Activity</p> | <p>AFNR Career Cluster – Environmental Service Systems Pathway, Statement 3<br/>                     AFNR Career Cluster – Environmental Service Systems Pathway, Statement 4<br/>                     AFNR Career Cluster – Natural Resources Systems Pathway, Statement 2<br/>                     AFNR Career Cluster – Natural Resources Systems Pathway, Statement 5<br/>                     AFNR Career Cluster – Plant Systems Pathway, Statement 2<br/>                     AFNR Career Cluster – Plant Systems Pathway, Statement 3<br/>                     CCSS.ELA-LITERACY.RST.11-12.8<br/>                     CCSS.ELA-LITERACY.SL.11-12.4<br/>                     HS-ESS3-2<br/>                     HS-ESS3-3<br/>                     HS-ESS3-4</p> |
| <p>NRS.04.01.02.b. Assess the methods used to improve a forest stand.</p>      | <p>Exam</p>          | <p>AFNR Career Cluster – Environmental Service Systems Pathway, Statement 3<br/>                     AFNR Career Cluster – Environmental Service Systems Pathway, Statement 4<br/>                     AFNR Career Cluster – Natural Resources Systems Pathway, Statement 2<br/>                     AFNR Career Cluster – Natural Resources Systems Pathway, Statement 5<br/>                     AFNR Career Cluster – Plant Systems Pathway, Statement 2<br/>                     AFNR Career Cluster – Plant Systems Pathway, Statement 3<br/>                     CCSS.ELA-LITERACY.RST.11-12.8<br/>                     CCSS.ELA-LITERACY.SL.11-12.4<br/>                     HS-ESS3-2<br/>                     HS-ESS3-3<br/>                     HS-ESS3-4</p> |

|  |                      |   |
|--|----------------------|---|
| <p>NRS.04.01.02.c. Create a timber stand improvement plan for a forest.</p>            | <p>Team Activity</p> | <p>AFNR Career Cluster – Environmental Service Systems Pathway, Statement 3<br/>                 AFNR Career Cluster – Environmental Service Systems Pathway, Statement 4<br/>                 AFNR Career Cluster – Natural Resources Systems Pathway, Statement 2<br/>                 AFNR Career Cluster – Natural Resources Systems Pathway, Statement 5<br/>                 AFNR Career Cluster – Plant Systems Pathway, Statement 2<br/>                 AFNR Career Cluster – Plant Systems Pathway, Statement 3<br/>                 CCSS.ELA-LITERACY.RST.11-12.8<br/>                 CCSS.ELA-LITERACY.SL.11-12.4<br/>                 HS-ESS3-2<br/>                 HS-ESS3-3<br/>                 HS-ESS3-4</p> |
| <p>NRS.04.01.03.b. Assess methods of wildlife habitat improvement.</p>                 | <p>Exam</p>          | <p>AFNR Career Cluster – Environmental Service Systems Pathway, Statement 3<br/>                 AFNR Career Cluster – Environmental Service Systems Pathway, Statement 4<br/>                 AFNR Career Cluster – Natural Resources Systems Pathway, Statement 2<br/>                 AFNR Career Cluster – Natural Resources Systems Pathway, Statement 5<br/>                 AFNR Career Cluster – Plant Systems Pathway, Statement 2<br/>                 AFNR Career Cluster – Plant Systems Pathway, Statement 3<br/>                 CCSS.ELA-LITERACY.RST.11-12.8<br/>                 CCSS.ELA-LITERACY.SL.11-12.4<br/>                 HS-ESS3-2<br/>                 HS-ESS3-3<br/>                 HS-ESS3-4</p> |
| <p>NRS.04.01.03.c. Devise a comprehensive improvement plan for a wildlife habitat.</p> | <p>Team Activity</p> | <p>AFNR Career Cluster – Environmental Service Systems Pathway, Statement 3<br/>                 AFNR Career Cluster – Environmental Service Systems Pathway, Statement 4<br/>                 AFNR Career Cluster – Natural Resources Systems Pathway, Statement 2<br/>                 AFNR Career Cluster – Natural Resources Systems Pathway, Statement 5<br/>                 AFNR Career Cluster – Plant Systems Pathway, Statement 2<br/>                 AFNR Career Cluster – Plant Systems Pathway, Statement 3<br/>                 CCSS.ELA-LITERACY.RST.11-12.8<br/>                 CCSS.ELA-LITERACY.SL.11-12.4<br/>                 HS-ESS3-2<br/>                 HS-ESS3-3<br/>                 HS-ESS3-4</p> |
| <p>NRS.04.01.04.b. Assess method of rangeland improvement.</p>                         | <p>Exam</p>          | <p>AFNR Career Cluster – Environmental Service Systems Pathway, Statement 3<br/>                 AFNR Career Cluster – Environmental Service Systems Pathway, Statement 4</p>   |

|  |                      |   |
|--|----------------------|---|
|  |                      | <p>AFNR Career Cluster – Natural Resources Systems Pathway, Statement 2</p> <p>AFNR Career Cluster – Natural Resources Systems Pathway, Statement 5</p> <p>AFNR Career Cluster – Plant Systems Pathway, Statement 2</p> <p>AFNR Career Cluster – Plant Systems Pathway, Statement 3</p> <p>CCSS.ELA-LITERACY.RST.11-12.8</p> <p>CCSS.ELA-LITERACY.SL.11-12.4</p> <p>HS-ESS3-2</p> <p>HS-ESS3-3</p> <p>HS-ESS3-4</p>   |
| <p>NRS.04.01.04.c. Evaluate and revise a rangeland management plan.</p>  | <p>Team Activity</p> | <p>AFNR Career Cluster – Environmental Service Systems Pathway, Statement 3</p> <p>AFNR Career Cluster – Environmental Service Systems Pathway, Statement 4</p> <p>AFNR Career Cluster – Natural Resources Systems Pathway, Statement 2</p> <p>AFNR Career Cluster – Natural Resources Systems Pathway, Statement 5</p> <p>AFNR Career Cluster – Plant Systems Pathway, Statement 2</p> <p>AFNR Career Cluster – Plant Systems Pathway, Statement 3</p> <p>CCSS.ELA-LITERACY.RST.11-12.8</p> <p>CCSS.ELA-LITERACY.SL.11-12.4</p> <p>HS-ESS3-2</p> <p>HS-ESS3-3</p> <p>HS-ESS3-4</p> |
| <p>NRS.04.01.05.b. Assess management techniques for improving outdoor recreation opportunities.</p>                        | <p>Exam</p>          | <p>AFNR Career Cluster – Environmental Service Systems Pathway, Statement 3</p> <p>AFNR Career Cluster – Environmental Service Systems Pathway, Statement 4</p> <p>AFNR Career Cluster – Natural Resources Systems Pathway, Statement 2</p> <p>AFNR Career Cluster – Natural Resources Systems Pathway, Statement 5</p> <p>AFNR Career Cluster – Plant Systems Pathway, Statement 2</p> <p>AFNR Career Cluster – Plant Systems Pathway, Statement 3</p> <p>CCSS.ELA-LITERACY.RST.11-12.8</p> <p>CCSS.ELA-LITERACY.SL.11-12.4</p> <p>HS-ESS3-2</p> <p>HS-ESS3-3</p> <p>HS-ESS3-4</p> |
| <p>NRS.04.01.05.c. Evaluate the impact of recreational activities on natural resources and create an improvement plan.</p> | <p>Team Activity</p> | <p>AFNR Career Cluster – Environmental Service Systems Pathway, Statement 3</p> <p>AFNR Career Cluster – Environmental Service Systems Pathway, Statement 4</p> <p>AFNR Career Cluster – Natural Resources Systems Pathway, Statement 2</p> <p>AFNR Career Cluster – Natural Resources Systems Pathway, Statement 5</p> <p>AFNR Career Cluster – Plant Systems Pathway, Statement 2</p>   |



|   |               |   |
|---|---------------|---|
|   |               | <p>AFNR Career Cluster – Plant Systems Pathway, Statement 3<br/>                 CCSS.ELA-LITERACY.RST.11-12.8<br/>                 CCSS.ELA-LITERACY.SL.11-12.4<br/>                 HS-ESS3-2<br/>                 HS-ESS3-3<br/>                 HS-ESS3-4</p>   |
| NRS.04.01.06.b. Assess methods to improve marine and coastal natural resources.   | Exam          | <p>AFNR Career Cluster – Environmental Service Systems Pathway, Statement 3<br/>                 AFNR Career Cluster – Environmental Service Systems Pathway, Statement 4<br/>                 AFNR Career Cluster – Natural Resources Systems Pathway, Statement 2<br/>                 AFNR Career Cluster – Natural Resources Systems Pathway, Statement 5<br/>                 AFNR Career Cluster – Plant Systems Pathway, Statement 2<br/>                 AFNR Career Cluster – Plant Systems Pathway, Statement 3<br/>                 CCSS.ELA-LITERACY.RST.11-12.8<br/>                 CCSS.ELA-LITERACY.SL.11-12.4<br/>                 HS-ESS3-2<br/>                 HS-ESS3-3<br/>                 HS-ESS3-4</p> |
| NRS.04.01.06.c. Create an improvement plan for marine or coastal natural resources.   | Team Activity | <p>AFNR Career Cluster – Environmental Service Systems Pathway, Statement 3<br/>                 AFNR Career Cluster – Environmental Service Systems Pathway, Statement 4<br/>                 AFNR Career Cluster – Natural Resources Systems Pathway, Statement 2<br/>                 AFNR Career Cluster – Natural Resources Systems Pathway, Statement 5<br/>                 AFNR Career Cluster – Plant Systems Pathway, Statement 2<br/>                 AFNR Career Cluster – Plant Systems Pathway, Statement 3<br/>                 CCSS.ELA-LITERACY.RST.11-12.8<br/>                 CCSS.ELA-LITERACY.SL.11-12.4<br/>                 HS-ESS3-2<br/>                 HS-ESS3-3<br/>                 HS-ESS3-4</p> |
| <p><b>NRS.04.02. Performance Indicator: Diagnose plant and wildlife diseases and follow protocols to prevent their spread</b></p> |               |   |
| NRS.04.02.01.c. Create a management plan to reduce infection and the spread of plant diseases in natural resource systems.        | Team Activity | <p>AFNR Career Cluster – Environmental Service Systems Pathway, Statement 3<br/>                 AFNR Career Cluster – Environmental Service Systems Pathway, Statement 4<br/>                 AFNR Career Cluster – Natural Resources Systems Pathway, Statement 2<br/>                 AFNR Career Cluster – Natural Resources Systems Pathway, Statement 5<br/>                 AFNR Career Cluster – Plant Systems Pathway, Statement 2<br/>                 AFNR Career Cluster – Plant Systems Pathway, Statement 3<br/>                 CCSS.ELA-LITERACY.RST.11-12.8</p>  |

|   |                      |   |
|---|----------------------|---|
|   |                      | <p>CCSS.ELA-LITERACY.SL.11-12.4<br/>                 HS-ESS3-2<br/>                 HS-ESS3-3<br/>                 HS-ESS3-4</p>  |
| <p>NRS.04.02.02.c. Create a management plan to reduce infection and spread of wildlife or aquatic species diseases in natural resource systems.</p> | <p>Team Activity</p> | <p>AFNR Career Cluster – Environmental Service Systems Pathway, Statement 3<br/>                 AFNR Career Cluster – Environmental Service Systems Pathway, Statement 4<br/>                 AFNR Career Cluster – Natural Resources Systems Pathway, Statement 2<br/>                 AFNR Career Cluster – Natural Resources Systems Pathway, Statement 5<br/>                 AFNR Career Cluster – Plant Systems Pathway, Statement 2<br/>                 AFNR Career Cluster – Plant Systems Pathway, Statement 3<br/>                 CCSS.ELA-LITERACY.RST.11-12.8<br/>                 CCSS.ELA-LITERACY.SL.11-12.4<br/>                 HS-ESS3-2<br/>                 HS-ESS3-3<br/>                 HS-ESS3-4</p> |

**NRS.04.03. Performance Indicator: Prevent or manage introduction of ecologically harmful species in a particular region.**

|   |                      |   |
|---|----------------------|---|
| <p>NRS.04.03.01.c. Create a management plan to reduce spread of harmful insects in natural resource systems.</p>          | <p>Team Activity</p> | <p>CCSS.ELA-LITERACY.RST.11-12.1<br/>                 CCSS.ELA-LITERACY.RST.11-12.7<br/>                 CCSS.ELA-LITERACY.RST.11-12.8<br/>                 CCSS.ELA-LITERACY.WHST.9-10.5<br/>                 CCSS.ELA-LITERACY.WHST.11-12.5<br/>                 CCSS.ELA-LITERACY.WHST.9-10.7<br/>                 CCSS.ELA-LITERACY.WHST.11-12.7<br/>                 CCSS.MATH.CONTENT.HSN-Q.A.1<br/>                 CCSS.MATH.CONTENT.HSN-Q.A.2<br/>                 CCSS.MATH.CONTENT.HSN-Q.A.3<br/>                 CCSS.MATH.CONTENT.HSS-ID.A.1<br/>                 CCSS.MATH.CONTENT.HSS-IC.A.1<br/>                 CCSS.MATH.CONTENT.HSS-IC.B.6<br/>                 HS-LS2-7<br/>                 HS-LS4-6</p> |
| <p>NRS.04.03.02.c. Create a management plan to reduce spread of harmful invasive species in natural resource systems.</p> | <p>Team Activity</p> | <p>CCSS.ELA-LITERACY.RST.11-12.1<br/>                 CCSS.ELA-LITERACY.RST.11-12.7<br/>                 CCSS.ELA-LITERACY.RST.11-12.8<br/>                 CCSS.ELA-LITERACY.WHST.9-10.5<br/>                 CCSS.ELA-LITERACY.WHST.11-12.5<br/>                 CCSS.ELA-LITERACY.WHST.9-10.7<br/>                 CCSS.ELA-LITERACY.WHST.11-12.7<br/>                 CCSS.MATH.CONTENT.HSN-Q.A.1<br/>                 CCSS.MATH.CONTENT.HSN-Q.A.2<br/>                 CCSS.MATH.CONTENT.HSN-Q.A.3<br/>                 CCSS.MATH.CONTENT.HSS-ID.A.1<br/>                 CCSS.MATH.CONTENT.HSS-IC.A.1</p>   |

|   |               |  |
|---|---------------|--|
|   |               | CCSS.MATH.CONTENT.HSS-IC.B.6<br>HS-LS2-7<br>HS-LS4-6   |
| NRS.04.03.03.c. Identify potentially invasive species and devise strategies to prevent ecological damage that would result from the introduction of that species. | Team Activity | CCSS.ELA-LITERACY.RST.11-12.1<br>CCSS.ELA-LITERACY.RST.11-12.7<br>CCSS.ELA-LITERACY.RST.11-12.8<br>CCSS.ELA-LITERACY.WHST.9-10.5<br>CCSS.ELA-LITERACY.WHST.11-12.5<br>CCSS.ELA-LITERACY.WHST.9-10.7<br>CCSS.ELA-LITERACY.WHST.11-12.7<br>CCSS.MATH.CONTENT.HSN-Q.A.1<br>CCSS.MATH.CONTENT.HSN-Q.A.2<br>CCSS.MATH.CONTENT.HSN-Q.A.3<br>CCSS.MATH.CONTENT.HSS-ID.A.1<br>CCSS.MATH.CONTENT.HSS-IC.A.1<br>CCSS.MATH.CONTENT.HSS-IC.B.6<br>HS-LS2-7<br>HS-LS4-6 |

**NRS.04.04. Performance Indicator: Manage fires in natural resource systems.**

|  |               |  |
|--|---------------|--|
| NRS.04.04.01.a. Differentiate between desirable and undesirable fires and research the role fire plays in a healthy ecosystem. | Exam          |  |
| NRS.04.04.01.c. Develop a prevention plan for harmful fires for a particular region.   | Team Activity |  |
| NRS.04.04.02.c. Anticipate and predict how fire management techniques will evolve in the future.                               | Team Activity |  |

**PS.01.02. Performance Indicator: Prepare and manage growing media for use in plant systems.**

|  |                                 |  |
|--|---------------------------------|--|
| PS.01.02.02.b. Discuss how soil drainage and water-holding capacity can be improved.                             | Soil Management Practicum, Exam |  |
| PS.01.02.02.c. Determine the hydraulic conductivity for soil and how the results influence irrigation practices. | Soils Management Practicum      |  |

**PS.01.03. Performance Indicator: Develop and implement a fertilization plan for specific plants or crops.**

|   |                            |  |
|---|----------------------------|--|
| PS.01.03.01.b. Analyze the effects of nutrient deficiencies and symptoms and recognize environmental causes of nutrient deficiencies. | Soils Management Practicum | CCSS.MATH.CONTENT.HSN.Q.A.2<br>CCSS.MATH.CONTENT.HSN.Q.A.3 |
| PS.01.03.02.c. Adjust the pH of growing media for specific plants or crops.   | Soils Management Practicum | CCSS.MATH.CONTENT.HSN.Q.A.2<br>CCSS.MATH.CONTENT.HSN.Q.A.3 |
| PS.01.03.03.b. Interpret laboratory analyses of soil and tissue samples.  | Soils Management Practicum | CCSS.MATH.CONTENT.HSN.Q.A.2<br>CCSS.MATH.CONTENT.HSN.Q.A.3 |
| PS.01.03.03.c. Prescribe fertilizer applications based on the results of a laboratory analysis of soil and plant tissue samples.      | Soils Management Practicum | CCSS.MATH.CONTENT.HSN.Q.A.2<br>CCSS.MATH.CONTENT.HSN.Q.A.3 |
| PS.01.03.04.b. Calculate the amount of fertilizer to be applied based on nutrient recommendation and fertilizer analysis.             | Soils Management Practicum | CCSS.MATH.CONTENT.HSN.Q.A.2<br>CCSS.MATH.CONTENT.HSN.Q.A.3 |
| PS.01.03.05.c. Devise a plan for soil management for a selected production method.  | Soils Management Practicum | CCSS.MATH.CONTENT.HSN.Q.A.2<br>CCSS.MATH.CONTENT.HSN.Q.A.3 |
| PS.01.03.06.b. Assess environmental factors on a crop.  | Soils Management Practicum | CCSS.MATH.CONTENT.HSN.Q.A.2<br>CCSS.MATH.CONTENT.HSN.Q.A.3 |
| PS.01.03.06.c. Devise a plan to meet plant nutrient needs based on environmental factors present.                                     | Soils Management Practicum | CCSS.MATH.CONTENT.HSN.Q.A.2<br>CCSS.MATH.CONTENT.HSN.Q.A.3 |

**PS.02.01. Performance Indicator: Classify plants according to taxonomic systems.**

|  |                      |  |
|--|----------------------|--|
| PS.02.01.02.a. Describe the morphological characteristics used to identify agricultural and herbaceous plants (e.g., life cycles, growth habit, plant use and as monocotyledons or dicotyledons, woody, herbaceous, etc.). | Exam, Identification |  |
| PS.02.01.02.b. Identify and describe important plants to agricultural and ornamental plant systems by common names.  | Identification       |  |

**PS.03.01. Performance Indicator: Demonstrate plant propagation techniques in plant system activities.**

|  |               |  |
|--|---------------|--|
| PS.03.01.05.c. Evaluate the impact of using genetically modified crops on other production practices.  | Team Activity |  |
| <b>PS.03.03. Performance Indicator: Develop and implement a plan for integrated pest management for plant production.</b>  |               |  |
| PS.03.03.01.c. Devise solutions for plant pests, diseases and disorders.   | Team Activity |  |
| <b>PS.03.05. Performance Indicator: Harvest, handle and store crops according to current industry standards.</b>   |               |  |
| PS.03.05.01.b. Assess the stage of growth to determine crop maturity or marketability and demonstrate proper harvesting techniques.  | Team Activity | CCSS.ELA-Literacy.RST.9-10.3<br>CCSS.ELA-Literacy.RST.9-10.4<br>CCSS.ELA-Literacy.WHST.9-10.2a   |
| PS.03.05.01.c. Analyze the processed used by mechanical harvesting equipment.  | Team Activity | CCSS.ELA-Literacy.RST.9-10.3<br>CCSS.ELA-Literacy.RST.9-10.4<br>CCSS.ELA-Literacy.WHST.9-10.2a   |
| <b>PS.04.02. Performance Indicator: Create designs using plants.</b>   |               |  |
| PS.04.02.03.c. Utilize green technologies and sustainable practices that prevent or limit negative environmental impacts.  | Team Activity | AFNR Career Cluster – Natural Resources Systems Pathway, Statement 3<br>AFNR Career Cluster – Plant Systems Pathway, Statement 2<br>STEM Career Cluster, Statement 4 |
| <b>PST.01.01. Performance Indicator: Apply physical science and engineering principles to assess and select energy sources for AFNR power, structural and technical systems.</b> |               |  |
| PST.01.01.01.b. Assess the environmental impacts of renewable and nonrenewable energy sources used in AFNR.  | Team Activity | AFNR Career Cluster, Statement 4<br>AFNR Career Cluster, Statement 5<br>HS-ESS3-3<br>HS-PS3-3  |
| PST.01.01.01.c. Design and implement methods to evaluate the efficiency of renewable and nonrenewable energy sources used in AFNR.   | Team Activity | AFNR Career Cluster, Statement 4<br>AFNR Career Cluster, Statement 5<br>HS-ESS3-3<br>HS-PS3-3  |
| PST.01.01.02.c. Devise a strategy to incorporate the use of selected energy sources in an ANFR enterprise or business.   | Team Activity | AFNR Career Cluster, Statement 4<br>AFNR Career Cluster, Statement 5<br>HS-ESS3-3<br>HS-PS3-3  |
| <b>PST.05.03. Performance Indicator: Apply geospatial technologies to solve problems and increase the efficiency of AFNR systems.</b>  |               |  |
| PST.05.03.01.b. Assess and analyze data collected utilizing geospatial technologies.   | Gps           | HS-ESS3-4<br>HS-ETS1-3<br>HS-ESS3-2  |

|  |                              |                                     |
|--|------------------------------|-------------------------------------|
| PST.05.03.01.c. Collect data and create maps utilizing geospatial technologies.  | Gps                          | HS-ESS3-4<br>HS-ETS1-3<br>HS-ESS3-2 |
| <b>CRP.02.01. Performance Indicator: Use strategic thinking to connect and apply academic learning, knowledge and skills to solve problems in the workplace and community.</b> |                              |                                     |
| CRP.02.01.01.b. Assess workplace problems and identify the most appropriate academic knowledge and skills to apply.  | Data Analysis, Team Activity |                                     |
| CRP.02.01.02.b. Assess community problems and identify the most appropriate academic knowledge and skills to apply.  | Team Activity                |                                     |
| CRP.02.01.02.c. Apply academic knowledge and skills to solve problems in the community and reflect upon results achieved.  | Team Activity                |                                     |
| <b>CRP.02.02. Performance Indicator: Use strategic thinking to connect and apply technical concepts to solve problems in the workplace and community.</b>                      |                              |                                     |
| CRP.02.02.01.b. Assess workplace problems and distinguish the most appropriate technical concepts to apply.  | Team Activity                |                                     |
| CRP.02.02.01.c. Apply technical concepts to solve problems in the workplace and reflect upon the results achieved.   | Team Activity                |                                     |
| <b>CRP.04.01. Performance Indicator: Speak using strategies that ensure clarity, logic, purpose and professionalism in formal and informal settings.</b>                       |                              |                                     |
| CRP.04.01.02.b. Apply strategies for speaking with clarity, logic, purpose and professionalism in a variety of situations in formal and informal settings.                     | Team Activity                |                                     |
| <b>CRP.04.02. Performance Indicator: Produce clear, reasoned and coherent written communication in formal and informal settings.</b>   |                              |                                     |
| CRP.04.02.02.c. Compose clear and coherent written documents (e.g., agendas, audio-visuales, drafts, forms, etc.) for formal and informal settings.                            | Team Activity                |                                     |
| <b>CRP.04.03. Performance Indicator: Model active listening strategies when interacting with others in formal and informal settings.</b>                                       |                              |                                     |

|   |                              |  |
|---|------------------------------|--|
| CRP.04.03.01.b. Apply active listening strategies (e.g., be attentive, observe non-verbal cues, ask clarifying questions, etc.).  | Team Activity                |  |
| CRP.04.03.02.c. Model active listening strategies in formal and informal settings.  | Team Activity                |  |
| <b>CRP.05.02. Performance Indicator: Make, defend and evaluate decisions at work and in the community using information about the potential environmental, social and economic impacts.</b> |                              |  |
| CRP.05.02.01.b. Apply a structured decision-making process to improve workplace and community situations.   | Data Analysis, Team Activity |  |
| CRP.05.02.01.c. Evaluate and defend decisions applied in the workplace and community situations.  | Data Analysis, Team Activity |  |
| CRP.05.02.02.b. Assess past decisions made in workplace and community and analyze their effects on environmental, social and economic situations.   | Data Analysis, Team Activity |  |
| CRP.05.02.02.c. Evaluate workplace and community situations and propose decisions to be made based upon the positive impact made on environment, social and economic areas. Data Analysis,  | Team Activity                |  |
| <b>CRP.06.01. Performance Indicator: Synthesize information, knowledge and experience to generate original ideas and challenge assumptions in the workplace and community.</b>              |                              |  |
| CRP.06.01.01.b. Synthesize information, knowledge and experiences to generate ideas for workplace and community situations.   | Team Activity                |  |
| <b>CRP.06.03. Performance Indicator: Create and execute a plan of action to act upon new ideas and introduce innovations to workplace and community organizations.</b>                      |                              |  |
| CRP.06.03.01.c. Design a plan of action to introduce a new idea or innovation into the workplace and community.   | Team Activity                |  |

|  |                              |  |
|--|------------------------------|--|
| CRP.06.03.02.b. Elicit and assimilate input and feedback from individuals and organizations about new ideas or innovations for the workplace or community.                                     | Data Analysis, Team Activity |  |
| <b>CRP.07.02. Performance Indicator: Evaluate the validity of sources and data used when considering the adoption of new technologies, practices and ideas in the workplace and community.</b> |                              |  |
| CRP.07.02.02.b. Assimilate data to assist in making a decision about the adoption of a new technology, practice or idea by workplaces and community organizations.                             | Data Analysis, Team Activity |  |
| CRP.07.02.02.c. Create and defend proposals for new technologies, practices and ideas using valid and reliable data sources.   | Data Analysis, Team Activity |  |
| <b>CRP.08.01. Performance Indicator: Apply reason and logic to evaluate workplace and community situations from multiple perspectives.</b>   |                              |  |
| CRP.08.01.01.b. Apply steps for critical thinking to a variety of workplace and community situations.  | Team Activity                |  |
| CRP.08.01.02.b. Assess solutions to workplace and community problems for evidence of reason, logic and consideration of multiple perspectives.   | Team Activity                |  |
| <b>CRP.08.02. Performance Indicator: Investigate, prioritize and select solutions to solve problems in the workplace and community.</b>  |                              |  |
| CRP.08.02.01.b. Assimilate and prioritize potential solutions to solve problems in the workplace and community.  | Team Activity                |  |
| CRP.08.02.01.c. Devise strategies to evaluate the effectiveness of solutions for resolving workplace and community problems.   | Team Activity                |  |
| CRP.08.02.02.b. Apply decision-making processes to generate possible solutions to solve workplace and community problems.  | Team Activity                |  |



|  |               |  |
|--|---------------|--|
| <b>CRP.08.03. Performance Indicator: Establish plans to solve workplace and community problems and execute them with resiliency.</b>   |               |  |
| CRP.08.03.02.b. Create plans to solve workplace and community problems.  | Team Activity |  |
| <b>CRP.09.01. Performance Indicator: Model characteristics of ethical and effective leaders in the workplace and community (e.g. integrity, self-awareness, self-regulation, etc.).</b>  |               |  |
| CRP.09.01.02.c. Model characteristics and actions of ethical and effective leaders in workplace and community situations (e.g., integrity, self-awareness, etc.).  | Team Activity |  |
| <b>CRP.09.03. Performance Indicator: Demonstrate behaviors that contribute to a positive morale and culture in the workplace and community (e.g., positively influencing others, effectively communicating, etc.).</b>                 |               |  |
| CRP.09.03.02.c. Model respectful and purposeful behaviors that contribute to positive morale and culture in the workplace and community (e.g., effectively communicating, recognizing accomplishments of others, etc.).                | Team Activity |  |
| <b>CRP.12.02. Performance Indicator: Create and implement strategies to engage team members to work toward team and organizational goals in a variety of workplace and community situations (e.g., meetings, presentations, etc.).</b> |               |  |
| CRP.12.02.01.c. Create novel strategies to engage team members based on the situation.   | Team Activity |  |