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|  | Environmental Science Curriculum GuideSCI 201/2022022-2023 |

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| **Evidence shows the student ...** | **Topic Score** |
| Demonstrates proficiency (AT) in all learning targets and success at Level 4 | 4.0 |
| Demonstrates proficiency (AT) in all learning targets with partial success at Level 4 | 3.5 |
| Demonstrates proficiency (AT) in **all** learning targets  | 3.0 |
| Demonstrates proficiency (AT) in **at least half** of the learning targets | 2.5 |
| Demonstrates some success criteria (PT) toward **all** learning targets | 2.0 |
| Demonstrates some success criteria (PT) towards **some** of the learning targets | 1.5 |
| Does not yet meet minimum criteria for the targets.  | 1.0 |
| Produces no evidence appropriate to the learning targets at any level  | 0 |

**Standards-Referenced Grading Basics**

**Our purpose in collecting a body of evidence is to:**

* Allow teachers to determine a defensible and credible topic score based on a representation of student learning over time.

**Start at Level 3 when determining a topic → score.**

* Clearly communicate where a student’s learning is based on a topic scale to inform instructional decisions and push student growth.
* Show student learning of targets through multiple and varying points of data
* Provide opportunities for feedback between student and teacher.

**Scoring**

A collaborative scoring process is encouraged to align expectations of the scale to artifacts collected. Routine use of a collaborative planning and scoring protocol results in calibration and a collective understanding of evidence of mastery. Enough evidence should be collected to accurately represent a progression of student learning as measured by the topic scale. Teachers look at all available evidence to determine a topic score. All topic scores should be defensible and credible through a body of evidence.

**Guiding Practices of Standards-Referenced Grading**

1. A consistent 4-point grading scale will be used.
2. Student achievement and behavior will be reported separately.
3. Scores will be based on a body of evidence.
4. Achievement will be organized by learning topic and converted to a grade at semester’s end.
5. Students will have multiple opportunities to demonstrate proficiency.
6. Accommodations and modifications will be provided for exceptional learners.

**\*\*\*Only scores of 4, 3.5, 3, 2.5, 2, 1.5, 1, and 0 can be entered as Topic Scores**.

**Multiple Opportunities**

Philosophically, there are two forms of multiple opportunities, both of which require backwards design and intentional planning. One form is opportunities planned by the teacher throughout the unit of study and/or throughout the semester. The other form is reassessment of learning which happens after completing assessment of learning at the end of a unit or chunk of learning.

Students will be allowed multiple opportunities to demonstrate proficiency. Teachers need reliable pieces of evidence to be confident students have a good grasp of the learning topics before deciding a final topic score. To make standards-referenced grading work, the idea of “multiple opportunities” is emphasized. If after these opportunities students still have not mastered Level 3, they may then be afforded the chance to reassess.

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| ***Unit*** | ***Content Topics*** | ***Connected NGSS Performance Expectations*** |
| *Ecosystems* | 1. *Ecosystems: Cycles of Energy*
 | [HS-LS2-4](http://www.nextgenscience.org/pe/hs-ls2-4-ecosystems-interactions-energy-and-dynamics),  |
| 1. *Ecosystems: Cycles of Matter*
 | [HS-LS2-5](http://www.nextgenscience.org/pe/hs-ls2-5-ecosystems-interactions-energy-and-dynamics) |
| 1. *Populations and Biodiversity*
 | [HS-LS2-1](http://www.nextgenscience.org/pe/hs-ls2-1-ecosystems-interactions-energy-and-dynamics),[HS-LS2-2](http://www.nextgenscience.org/pe/hs-ls2-2-ecosystems-interactions-energy-and-dynamics), [HS-LS2-6](http://www.nextgenscience.org/pe/hs-ls2-6-ecosystems-interactions-energy-and-dynamics) |
| *Energy* | 1. *Energy Resources*
 | [HS-ESS2-6](http://www.nextgenscience.org/pe/hs-ess2-6-earths-systems), [HS-ESS3-2](http://www.nextgenscience.org/pe/hs-ess3-2-earth-and-human-activity), [HS-ETS1-1](http://www.nextgenscience.org/pe/hs-ets1-1-engineering-design) |
| **End of Semester 1** |
|  *Climate* | 1. Driving Forces of Weather and Climate
 | [HS-ESS2-2](http://www.nextgenscience.org/pe/hs-ess2-2-earths-systems)**,** [HS-ESS2-4](http://www.nextgenscience.org/pe/hs-ess2-4-earths-systems)**,** |
| 1. Human Induced Climate Change
 | [HS-ESS3-5](http://www.nextgenscience.org/pe/hs-ess3-5-earth-and-human-activity)**,** [HS-ESS3-6](http://www.nextgenscience.org/pe/hs-ess3-6-earth-and-human-activity) |
|  *Land Use* | 1. Land Use and Waste Management
 | [HS-ESS3-1](http://www.nextgenscience.org/pe/hs-ess3-1-earth-and-human-activity)**,** [HS-ESS3-6](http://www.nextgenscience.org/pe/hs-ess3-6-earth-and-human-activity)**,** [HS-ETS1-3](http://www.nextgenscience.org/pe/hs-ets1-3-engineering-design) |
| 1. Water and Farming
 | [HS-ESS2-5](http://www.nextgenscience.org/pe/hs-ess2-5-earths-systems)**,** [HS-ESS3-1](http://www.nextgenscience.org/pe/hs-ess3-1-earth-and-human-activity)**,** [HS-ESS3-4](http://www.nextgenscience.org/pe/hs-ess3-4-earth-and-human-activity)**,** |
|  *Solutions* | 1. Designing Solutions to Address Human Impacts
 | [HS-LS2-7](http://www.nextgenscience.org/pe/hs-ls2-7-ecosystems-interactions-energy-and-dynamics)[HS- ETS1-1, HS-ETS1-2, HS ETS1-3](https://iowacore.gov/iowa-core/subject/science/11/engineering%2C-technology%2C-and-applications-of-science/engineering-design) |

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| Topic: Ecosystems: Cycles of Energy |
| Driving Questions: How is matter and energy linked in Ecosystems?  |
| Crosscutting Concepts: Energy and Matter |
| Science and Engineering Practices: Using mathematical representations to support claims. |
| Iowa Core Science Standards: [HS-LS2-4](http://www.nextgenscience.org/pe/hs-ls2-4-ecosystems-interactions-energy-and-dynamics) |
| Level 4 | Level 3 | Level 2 | Level 1 |
| In addition to score 3.0 performance, the student demonstrates in-depth inferences and applications that go beyond what was taught. | ***In response to observed phenomena, students will…***1. Use mathematical representation(s) to support claims that include the idea that energy flows from one trophic level to another as well as through the environment. ([HS-LS2-4](http://www.nextgenscience.org/pe/hs-ls2-4-ecosystems-interactions-energy-and-dynamics))

 1. Analyze and use mathematical representation(s) to account for the energy not transferred to higher trophic levels but which is instead used for growth, maintenance, or repair, and/or transferred to the environment, and the inefficiencies in transfer of matter and energy. (HS-LS2-4)
 | ***In response to observed phenomena, students will…***1. 1. Identify and describe the relative quantities of organisms, matter, and energy, in a food web and an ecosystem.

2. Use the mathematical representation(10% rule) of the food web to describe the transfer of matter (as atoms and molecules) and flow of energy upward between organisms and their environment;  1. 1. Identify the relative proportion of organisms at each trophic level by correctly identifying producers as the lowest trophic level having the greatest biomass and energy and consumers decreasing in numbers at higher trophic levels.

2. Describe where energy goes when it is not transferred to a higher trophic level.  Recognize or recall specific vocabulary such as: biotic, abiotic, foodweb/chain, trophic level, autotroph, heterotroph, producer, primary consumer, secondary consumer, tertiary consumer, decomposer | Student’s performance reflects insufficient progress towards foundational skills and knowledge. |

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| Topic: Ecosystems: Cycles of Matter |
| Driving Questions: How does matter (specifically carbon) move through ecosystems?  |
| Crosscutting Concepts: System and System Models |
| Science and Engineering Practices: Develop models and using models |
| Iowa Core Science Standards: [HS-LS2-5](http://www.nextgenscience.org/pe/hs-ls2-5-ecosystems-interactions-energy-and-dynamics) |
| Level 4 | Level 3 | Level 2 | Level 1 |
| In addition to score 3.0 performance, the student demonstrates in-depth inferences and applications that go beyond what was taught. | ***In response to observed phenomena, students will…***1. Develop a model to illustrate the role of photosynthesis and cellular respiration in the cycling of carbon among the biosphere, atmosphere, hydrosphere, and geosphere. [HS-LS2-5](http://www.nextgenscience.org/pe/hs-ls2-5-ecosystems-interactions-energy-and-dynamics)

  | ***In response to observed phenomena, students will…***1. 1. Identify and describe the path of carbon between the biosphere, atmosphere, hydrosphere, and geosphere.

2. Using their model, describe the exchange of carbon (through carbon-containing compounds) between organisms and the environment. 3. Using their model, describe the role of storing carbon (carbon sink) in organisms (in the form of carbon-containing compounds) as part of the carbon cycle. Recognize or recall specific vocabulary such as: atmosphere, hydrosphere, biosphere, geosphere, carbon sink, | Student’s performance reflects insufficient progress towards foundational skills and knowledge. |

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| Topic: Populations and Biodiversity |
| Driving Questions: How and why do populations change over time? What happens if a population uses up its resources |
| Crosscutting Concepts: Scale, Proportion and Quantity, Stability and Change |
| Science and Engineering Practices: develop models, use mathematical representations to support claims, design, evaluate, and refine solutions |
| Iowa Core Science Standards: [HS-LS2-1](http://www.nextgenscience.org/pe/hs-ls2-1-ecosystems-interactions-energy-and-dynamics), [HS-LS2-2](http://www.nextgenscience.org/pe/hs-ls2-2-ecosystems-interactions-energy-and-dynamics), [HS-LS2-6](http://www.nextgenscience.org/pe/hs-ls2-6-ecosystems-interactions-energy-and-dynamics) |
| Level 4 | Level 3 | Level 2 | Level 1 |
| In addition to score 3.0 performance, the student demonstrates in-depth inferences and applications that go beyond what was taught. | ***In response to observed phenomena, students will…***1. Analyze simulations to identify the interdependence of factors (both living and nonliving) and the resulting effect on carrying capacity. ([HS-LS2-1](http://www.nextgenscience.org/pe/hs-ls2-1-ecosystems-interactions-energy-and-dynamics))
2. Create a claim, using evidence, to explain which factor(s) have the largest effect on the carrying capacity of an ecosystem for a given population. ([HS-LS2-1](http://www.nextgenscience.org/pe/hs-ls2-1-ecosystems-interactions-energy-and-dynamics))
3. Analyze mathematical representations (charts, histograms, data tables, etc.) to identify and describe the relationship between factors that affect the biodiversity of ecosystems including number and types of organisms represented and interaction between ecosystems at different scales. ([HS-LS2-2](http://www.nextgenscience.org/pe/hs-ls2-2-ecosystems-interactions-energy-and-dynamics))
4. Evaluate the claims, evidence, and reasoning that complex interactions in ecosystems maintain relatively stable conditions, but changing conditions may result in a new ecosystem. ([HS-LS2-6](http://www.nextgenscience.org/pe/hs-ls2-6-ecosystems-interactions-energy-and-dynamics))
 | ***In response to observed phenomena, students will…***1. Identify and describe multiple factors that affect carrying capacities of ecosystems for given populations. (factors could include: boundaries, resources, climate, predation, disease, diversity, and competition)
2. Explain how the populations and number of organisms in ecosystems vary as a function of the physical and biological factors of the ecosystem.
3. Identify potential factors that determine biodiversity and population numbers of an ecosystem for a given situation
4. Describe how the response of an ecosystem to a small change might not significantly affect populations, whereas the response to a large change can have a large effect on populations. (primary and secondary succession)

Recognize or recall specific vocabulary such as: population, community, carrying capacity, exponential growth, logistic growth, limiting factor, predation, competition biodiversity (including 3 levels: genetic, species, ecosystem), deforestation, extinction, conservation, habitat, niche, succession, resilience | Student’s performance reflects insufficient progress towards foundational skills and knowledge. |

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| Topic: Energy Resources |
| Driving Questions: Where does our energy come from? What is the impact of our energy usage on the Earth System? |
| Crosscutting Concepts: stability and change, energy and matter, connection to engineering |
| Science and Engineering Practices: Constructing arguments, developing models, and evaluating design solutions |
| Iowa Core Science Standards: [HS-ESS2-6](http://www.nextgenscience.org/pe/hs-ess2-6-earths-systems), HS-ESS3-2, HS-ETS1-1 |
| Level 4 | Level 3 | Level 2 | Level 1 |
| In addition to score 3.0 performance, the student demonstrates in-depth inferences and applications that go beyond what was taught. | ***In response to observed phenomena, students will…***1. Modify a model to describe the lifecycle of fossil fuels by tracking the movement of carbon between the hydrosphere, atmosphere, geosphere, and biosphere. ([HS-ESS2-6](http://www.nextgenscience.org/pe/hs-ess2-6-earths-systems))
2. Predict the impact of energy sources on the relative amounts of carbon present in different spheres and the effect on climate. ([HS-ESS2-6](http://www.nextgenscience.org/pe/hs-ess2-6-earths-systems))
3. Evaluate competing design solutions for developing, managing, and utilizing energy and mineral resources based on cost-benefit ratios (reference [HS-ESS3-2](http://www.nextgenscience.org/pe/hs-ess3-2-earth-and-human-activity), [HS-ETS1-1](http://www.nextgenscience.org/pe/hs-ets1-1-engineering-design)evidence statements for the rubric design) ([HS-ESS3-2](http://www.nextgenscience.org/pe/hs-ess3-2-earth-and-human-activity))

Potential Level 4 Target: Evaluate the associated economic, environmental, and geopolitical costs, risks, and benefits for multiple types of renewable and non-renewable energy resources. | ***In response to observed phenomena, students will…***1. 1. Describe the origins of fossil fuels

2. Identify the relative concentrations of carbon present in the hydrosphere, atmosphere, geosphere and biosphere.1. Identify and describe the life cycle of multiple types of renewable and non-renewable energy. (Coal, Oil, Natural Gas, Wind, Solar, Biomass, Tidal, Geothermal, Hydro, Nuclear, etc.)
2. 1. Compare and contrast the cost of extracting or developing the energy reserve.

2. Compare and contrast the waste generation and transmission associated with the extraction and use of various energy resources.Recognize or recall specific vocabulary such as:Mineral, natural resource, renewable, non-renewable, fossil fuel, extraction, efficiency, reclamation, recycling, life cycle, combustion  | Student’s performance reflects insufficient progress towards foundational skills and knowledge. |

**End of Semester 1**

**Semester 2**

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| Topic: Driving Forces of Weather Climate |
| Driving Questions: What regulates our weather and climate? |
| Crosscutting Concepts: Cause and Effect, Stability and Change,  |
| Science and Engineering Practices: Analyzing and Interpreting Data, Developing and using Models |
| Iowa Core Science Standards: [HS-ESS2-2](http://www.nextgenscience.org/pe/hs-ess2-2-earths-systems), [HS-ESS2-4](http://www.nextgenscience.org/pe/hs-ess2-4-earths-systems),  |
| Level 4 | Level 3 | Level 2 | Level 1 |
| In addition to score 3.0 performance, the student demonstrates in-depth inferences and applications that go beyond what was taught. | ***In response to observed phenomena, students will…***1. Analyze geoscience data to make the claim that one change to Earth’s surface can create feedbacks that causes changes to other Earth systems. ([HS-ESS2-2](http://www.nextgenscience.org/pe/hs-ess2-2-earths-systems))
2. Analyze data to describe a mechanism for the feedbacks between two of Earth’s systems and whether the feedback is positive or negative. ([HS-ESS2-2](http://www.nextgenscience.org/pe/hs-ess2-2-earths-systems))
3. Use a model to describe how variations in the flow of energy into and out of Earth systems result in changes in climate. ([HS-ESS2-4](http://www.nextgenscience.org/pe/hs-ess2-4-earths-systems))
 | ***In response to observed phenomena, students will…***1. Identify relationships between data sets that represent changes in the hydrosphere, cryosphere, atmosphere, biosphere, or geosphere in response to a change in Earth’s surface.
2. Define and provide an example of a positive and negative feedback loop
3. Given models (Sun/Earth), identify one factor that affects the input of energy, one factor that affects the output of energy, and one factor that affects the storage and redistribution of energy.

 (Factors may include: Earth’s orbit and the orientation of its axis; sun’s energy output; configuration of continents resulting from tectonic activity; ocean circulation; atmospheric composition (including amount of water vapor and CO2); atmospheric circulation; volcanic activity; glaciation; extent or type of vegetation cover; and human activities.)Recognize or recall specific vocabulary such as:Weather, climate, positive and negative feedback loop, albedo, Milankovitch cycles, electromagnetic radiation, greenhouse effect, greenhouse gas,  | Student’s performance reflects insufficient progress towards foundational skills and knowledge. |

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| Topic: Human Induced Climate Change |
| Driving Questions: What effects are humans having on the climate and atmosphere? |
| Crosscutting Concepts: Systems and System Models, Stability and Change |
| Science and Engineering Practices: Analyzing and Interpreting Data, Engaging in Argument from Evidence |
| Iowa Core Science Standard: [HS-ESS3-5](http://www.nextgenscience.org/pe/hs-ess3-5-earth-and-human-activity), [HS-ESS3-6](http://www.nextgenscience.org/pe/hs-ess3-6-earth-and-human-activity) |
| Level 4 | Level 3 | Level 2 | Level 1 |
| In addition to score 3.0 performance, the student demonstrates in-depth inferences and applications that go beyond what was taught. | ***In response to observed phenomena, students will…***1. Analyze data from global climate models (e.g., computational simulations) and climate observations over time that relate the effects of climate change to the chemical composition of the atmosphere, geosphere, hydrosphere, or cryosphere. ([HS-ESS3-5](http://www.nextgenscience.org/pe/hs-ess3-5-earth-and-human-activity))
2. Use data to predict the future effect of climate change on Earth’s physical parameters (e.g., temperature, precipitation, sea level) or chemical composition (e.g., ocean pH). ([HS-ESS3-5](http://www.nextgenscience.org/pe/hs-ess3-5-earth-and-human-activity))
3. Illustrate and describe how human induced changes in the atmosphere and climate can cause changes in other Earth systems. ([HS-ESS3-6](http://www.nextgenscience.org/pe/hs-ess3-6-earth-and-human-activity))

Potential Level 4 target: Evaluate the claims, evidence, reasoning, and uncertainty behind currently accepted climate predictions | ***In response to observed phenomena, students will…***1. 1. Describe what climate change data sets represent

2. Describe whether the predicted effect on the system is reversible or irreversible.3. Identify the misconceptions between the hole in the ozone layer and causes of climate change1. Compare and contrast present and past climate using associated physical parameters (e.g., temperature, precipitation, sea level) and chemical composition (e.g., ocean pH) of the atmosphere, geosphere, hydrosphere or cryosphere.
2. Identify human activities that adversely impact the climate
3. Describe possible strategies to address human induced climate change

Recognize or recall specific vocabulary such as:Chlorofluorocarbons, ozone, volatile organic compounds, methane, combustion, nitrogen oxides, proxy indicators, ocean acidification, thermal expansion, carbon sequestration | Student’s performance reflects insufficient progress towards foundational skills and knowledge. |

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| Topic: Land Use and Waste Management |
| Driving Questions: How do the availability of resources, climate, and natural hazards impact land use? How has human development impacted land use and the Earth System? |
| Crosscutting Concepts: Cause and Effect, Systems and System Models |
| Science and Engineering Practices: Constructing Explanations and Designing Solutions, Mathematical and Computational Thinking |
| Iowa Core Science Standards: [HS-ESS3-1](http://www.nextgenscience.org/pe/hs-ess3-1-earth-and-human-activity), [HS-ESS3-6](http://www.nextgenscience.org/pe/hs-ess3-6-earth-and-human-activity), [HS-ETS1-3](http://www.nextgenscience.org/pe/hs-ets1-3-engineering-design) |
| Level 4 | Level 3 | Level 2 | Level 1 |
| In addition to score 3.0 performance, the student demonstrates in-depth inferences and applications that go beyond what was taught. | ***In response to observed phenomena, students will…***1. Construct an explanation based on evidence for how the availability of natural resources, occurrence of natural hazards, and changes in climate have influenced human activity (for example, focus on how access to key natural resources such as access to fresh water (such as rivers, lakes, and groundwater), regions of fertile soils such as river deltas, and high concentrations of minerals and fossil fuels influence human settlement and land use. ([HS-ESS3-1](http://www.nextgenscience.org/pe/hs-ess3-1-earth-and-human-activity))
2. Predict how the results of changes in climate will affect populations or drive mass migrations. (such as changes to sea level, regional patterns of temperature and precipitation, and the types of crops and livestock that can be raised). ([HS-ESS3-1](http://www.nextgenscience.org/pe/hs-ess3-1-earth-and-human-activity))
3. Use a computational representations (land-use maps, satellite photography, population graphs, and demographic data) to illustrate how the geosphere and atmosphere has been modified by human activity. (Examples should focus on manipulations of the Iowa landscape with a priority given to land use, air quality, and waste management) ([HS-ESS3-6](http://www.nextgenscience.org/pe/hs-ess3-6-earth-and-human-activity))

Possible Extension: Evaluate/Create a solution to a land management/development issue that focuses at a local level. Take into account social, cultural, environmental, and economic impacts and evaluate using a range of pre-specified constraints. | ***In response to observed phenomena, students will…***1. 1. Identify the driving forces that determine the location of urban centers

2. Describe how technology has changed human activity pertaining to natural resources, natural hazards, and climate.1. Describe the effect of natural hazards, changes in climate, and the availability of natural resources on features of human societies, including population size and migration patterns
2. 1. Describe the impacts of urbanization and transportation on land use and air quality

2.Identify methods to reduce waste and decrease our impact on the land3. Compare and contrast waste management techniques (landfills, dumps, incinerators, compost)Recognize or recall specific vocabulary such as:* Urban, rural, urban sprawl, urbanization, land degradation, Landfill, incinerator, compost, recycle, heat island effect, deforestation, reclamation
 | Student’s performance reflects insufficient progress towards foundational skills and knowledge. |

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| Topic: Water and Farming |
| Driving Questions: How do the availability of resources and climate conditions impact farming and water use? |
| Crosscutting Concepts: Structure and Function, Stability and Change |
| Science and Engineering Practices: Constructing Explanations and Designing Solutions, Planning and Carrying out Investigations |
| Iowa Core Science Standards: [HS-ESS2-5](http://www.nextgenscience.org/pe/hs-ess2-5-earths-systems), [HS-ESS3-4](http://www.nextgenscience.org/pe/hs-ess3-4-earth-and-human-activity), |
| Level 4 | Level 3 | Level 2 | Level 1 |
| In addition to score 3.0 performance, the student demonstrates in-depth inferences and applications that go beyond what was taught. | ***In response to observed phenomena, students will…***1. Plan and conduct an investigation involving the impacts of erosion, ground water pollution, salinization, or runoff emphasizing the connection between the hydrological cycle and farming. ([HS-ESS2-5](http://www.nextgenscience.org/pe/hs-ess2-5-earths-systems))
2. Evaluate a technological solution that reduces the impact of human activities on natural systems with an emphasis on farming practices and water quality issues. ([HS-ESS3-4](http://www.nextgenscience.org/pe/hs-ess3-4-earth-and-human-activity))

Potential Level 4 Target: Create an evidence based argument to support the claim: the sustainability of human society and biodiversity requires the responsible management of natural resources. | ***In response to observed phenomena, students will…***1. 1. Describe how water is distributed globally

2. Describe basic properties of soil (texture, fertility, permeability, porosity)1. 1. Identify the pros and cons of modern industrial farming versus subsistence farming

2. Describe how buffer strips, terraces, contour planting, no-till, cover crops, and shelter belts promote soil conservations and water qualityRecognize or recall specific vocabulary such as:Precipitation, evaporation, condensation, transpiration, surface water, groundwater, aquifer, point source, non-point source, salinization, erosion, eutrophication, runoff, agriculture, sustainability, pesticide, herbicide, nitrate, phosphate, sediment, overgrazing, desertification | Student’s performance reflects insufficient progress towards foundational skills and knowledge. |

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| Topic: Designing Solutions to Address Human Impacts |
| Driving Questions: How can we make a difference? |
|  Crosscutting Concepts: Stability and Change |
| Science and Engineering Practices: Construction Explanations and Design Solutions |
| Iowa Core Science Standards: [HS-LS2-7](http://www.nextgenscience.org/pe/hs-ls2-7-ecosystems-interactions-energy-and-dynamics) [HS ETS1-1, HS ETS1-2, HS ETS1-3](https://iowacore.gov/iowa-core/subject/science/11/engineering%2C-technology%2C-and-applications-of-science/engineering-design) |
| Level 4 | Level 3 | Level 2 | Level 1 |
| In addition to score 3.0 performance, the student demonstrates in-depth inferences and applications that go beyond what was taught. | ***In response to observed phenomena, students will…***1. Design a solution that involves reducing the negative effects of human activities on the environment and biodiversity, and that relies on scientific knowledge of the factors affecting changes and stability in biodiversity. (Examples of factors include but are not limited to: Overpopulation; Overexploitation; Habitat destruction; Pollution; Introduction of invasive species; and Changes in climate.)
2. Evaluate the economic, social/cultural, and environmental impacts, of the proposed solution for a select human activity that is harmful to an ecosystem.
3. Refine the proposed solution by prioritizing the criteria and making tradeoffs as necessary to further reduce environmental impact and loss of biodiversity while addressing human needs.

**This topic should be addressed throughout the year resulting in a final capstone project.** | ***In response to observed phenomena, students will…***1. Describe how the proposed solution decreases the negative effects of human activity on the environment and biodiversity
2. 1. Develop criteria for evaluating the proposed solution

2. Describe the proposed solutions impact on overall environmental stability.1. Students describe the criteria and constraints for the solution to the problem, along with the tradeoffs in the solution.
 | Student’s performance reflects insufficient progress towards foundational skills and knowledge. |