Biology Core

J.S. Morton HS District 201
2014-2015

Email:
Classroom
Web:

What will students learn in this course?

Key Concepts	Standards (Students can)
Energy	Show the process of photosynthesis.
	Explain how carbon based molecules can be assembled into larger molecules.
	Show how cellular respiration works to recycle molecules.
Ecosystems	Explain how anaerobic and aerobic processes provide energy for life through cellular respiration and photosynthesis.
	Explain the quantity of energy lost from one trophic level to the next and why the highest trophic level has the least amount of energy.
	Show how carbon cycles through the biosphere, atmosphere, hydrosphere, geosphere.
Interactions	Use a graph or chart to mathematically show how populations are affected by living and nonliving factors
	Show how populations are affected by biodiversity and limiting factors in an ecosystem.
	Propose a solution to reducing the impacts of human activities on the environment and biodiversity.
	Explain how changing conditions in an ecosystem can affect the size of a population.
Structures and Processes	Explain the hierarchical organization of interacting systems within an organism.
	Demonstrate how the organ systems work together and how they affect the organisms.
	Understand how homeostasis regulates internal conditions in a living system.
	Interpret linear models. Evaluate how feedback mechanisms can encourage (positive feedback) and discourage (negative feedback) what happens in a living system.
DNA Structure and Protein Synthesis	Construct an explanation based on evidence for how the structure of DNA determines the structure of proteins which carry out the essential functions of life through systems of specialized cells.
	Ask questions to clarify relationships about the role of DNA and chromosomes in coding the instructions for characteristic traits passed from parents to offspring.
Heredity	Make and defend a claim based on evidence that inheritable genetic variation may result from: (1) new genetic combination through meiosis, (2) viable errors occurring during replication, and / or (3) mutations caused by environmental factors
	Apply concepts of statistics and probability to explain the variation and distribution of expressed traits in a population
Evidence of Evolution	Communicate scientific information that common ancestry and biological evolution are supported by multiple lines of empirical evidence.
Processes of Evolution	Construct an explanation based on evidence for how natural selection leads to adaptation of populations.
	Apply concepts of statistics and probability to support explanations that organisms with an advantageous heritable trait tend to increase in proportion to organisms lacking this trait.
	Evaluate the evidence supporting claims that changes in environmental conditions may result in: (1) increases in the number of individuals of some species, (2) the emergence of new species over time, and (3) the extinction of other species

How will we know students have learned it?

Grade Scale	A- Advanced/Exemplary	B- Proficient	C- Basic	D- Needs Improvement	E- Not Passing	I - Incomplete
	4.0-5.0	3.0-3.9	2.0-2.9	1.0-1.9	0.0-0.9	

Key Concept Weights	Semester 1		Semester 2	
	Energy	20.00%	DNA Structure and Protein Synthesis	20.00%
	Ecology	20.00%	Heredity	20.00%
	Interactions	20.00%	Evidence of Evolution	20.00%
	Structures and Processes	20.00%	Processes of Evolution	20.00%
	Semester 1 exam	20.00%	Semester 2 Exam	20.00%

Within each unit, assignments will be graded according to the following weights:

Assignment Categories		
	Common Assessments	60%
	Performance Based Assessments	30%
	Practice (formative)	10%

Practice (formative) assignments are 10% in each key concept because students should not be unduly penalized for mistakes during the learning process. The grade is primarily based on mastery of standards, and mastery is demonstrated on assessments.

Students who do not achieve a minimum score of 1.0 on each Key Concept and/or do not complete the Course Requirements will receive an I (incomplete) for the semester. If requirements are not met within six weeks after the semester, the student will earn a grade of E and fail the semester.

Semester 1 Key Concepts	Course Requirement
Energy	Common Assessment Vernier Lab: Endo- and Exo- Thermic Reactions Photosynthesis / Cellular Respiration Lab Enzyme Lab
Ecology	Common Assessment Vernier Lab: Heat Island Food Web activity
Interactions	Common Assessment Vernier Lab: Acid/Bases Population Dynamics Lab Invasive Species activity Competition Lab
Structures and Processes	Common Assessment Vernier Lab: Respiration Feedback Loop Lab Diffusion/Osmosis Lab

Semester 2 Key Concepts	Course Requirement
DNA	Common Assessment Vernier Lab: Hot Hands DNA model Lab DNA extraction Lab Protein Synthesis Lab
Heredity	Common Assessment Vernier Lab: Lactase Action Genetics Activity/Lab Pedigree Construction/Analysis Lab
Evidence of Evolution	Common Assessment Vernier Lab: Grip Lab Natural Selection Activity Adaptation Lab
Process of Evolution	Common Assessment Vernier Lab: Student Created Grip Lab (full write up) Classification Lab Natural Selection and Gene Frequencies Lab

What will we do when students aren't learning?

Extra Help

Students who are not passing the course are expected to seek extra help. Further, any student who wants to improve his or her performance and grade is encouraged to ask for support, as well.

***** Classroom: C109 When? After school, Monday-Wednesday-Friday

* What other extra help options are available? By appointment depending upon availability.

Re-do/Re-Take

Students are eligible and **expected** to re-do essays, projects, quizzes, labs and tests that do not meet or exceed standards. Daily assignments may be eligible for re-do only at the teacher's discretion. Students will be provided one opportunity for re-do on a given item, with any additional attempts at the teacher's discretion.

If not already required by the teacher, students must request a re-do within one week after receiving the graded assignment. The teacher will communicate any requirements that must be met prior to the re-do (i.e. after-school tutoring, extra practice assignments, etc.), as well as the deadline.

The maximum grade earned shall be full credit, given the original item is submitted on time with full effort. The teacher has the discretion to return any item, ungraded, that is incomplete or does not demonstrate full effort. That item will be subject to my late work policy, with the final grade reflecting any loss of credit due to late or incomplete submission.

Other than common assessments, teachers may provide an alternative assignment to demonstrate mastery.

What will we do when students have already learned it?

Students who master the standards before the end of the unit will be offered enrichment assignments or projects to extend their learning. Students who decline are expected to complete required unit assignments and assessments.

Procedures

- Students are expected to inquire about missed learning/assignments immediately upon return from an absence.
- Students may make up or re-take tests in the classroom on [Fridays, after school] or at the testing center, available from 8:00-8:45 on Late Start Days.

- Students must bring their Inspiron 11 to class every day.
- All course materials, including the link to the online text book, are available on the class web page.
- Students must be in their seats before the bell rings to begin class.
- Parents are strongly encouraged to use Skyward Family Access to be informed on students' progress. For assistance setting up a password, contact the parent liaison at xxx.xxx.xxxx or xxxxxx@jsmorton.org

KEY CONCEPT

ENERGY FLOW THROUGH ECOSYSTEMS

	E	D	C	B	A	
Standard	**0-0.9**	**1 - Minimal Understanding**	**2 - Basic**	**3 - Proficient**	**4 - Advanced**	**5 - Exemplary**
Photosynthesis HS-LS1-5	Student does not demonstrate a minimal understanding of the standard.	Students can use a model to illustrate how light energy is transformed into chemical energy. (showing all inputs and outputs)	Student can explain both the reactants and products of photosynthesis, recognize the chemical formula for each item and their general roles in photosynthesis.	Students can create the chemical equation for photosynthesis and explain the corresponding relationship to the model.	Students can create the balanced chemical equation for photosynthesis and explain the corresponding relationship to the model as well as explain the function of the chloroplast and chlorophyll.	Student demonstrates an understanding of the key concept beyond the advanced level and completes a teacher guided independent assignment such as a lab, research paper, class report, etc.
Carbon Based Molecules HS-LS1-6	Student does not demonstrate a minimal understanding of the standard.	Given a simple scenario with data students can explain how C, H and O in sugars are used to form amino acids and macromolecules	Student can explain the function of each macro molecule and the understanding that they all contain C,H and O	Students can explain chemical bonds contain energy and the function of enzymes in biological systems as they relate to chemical reactions.	Students can differentiate between the 4 basic macromolecules based upon their chemical properties and make predictions or explanations for data concerning reaction rates and the formation of macromolecules from sugars.	Student demonstrates an understanding of the key concept beyond the advanced level and completes a teacher guided independent assignment such as a lab, research paper, class report, etc.
Respiration HS-LS1-7	Student does not demonstrate a minimal understanding of the standard.	Students can make a model to represent how sugar is transformed into chemical energy with oxygen. (showing all products and reactants)	Students can explain the similarities and differences of aerobic and anaerobic respiration	Students can create the balanced chemical equation for cellular respiration and explain the corresponding relationship to the model.	Students can explain how the equation for photosynthesis and the equation for cellular respiration are interdependent and how this can be seen in the oxygen cycle.	Student demonstrates an understanding of the key concept beyond the advanced level and completes a teacher guided independent assignment such as a lab, research paper, class report, etc.

KEY CONCEPT

ENERGY FLOW THROUGH ECOSYSTEMS

	E	D	C	B	A	
Standard	**0-0.9**	**1 - Minimal Understanding**	**2 - Basic**	**3 - Proficient**	**4 - Advanced**	**5 - Exemplary**
aerobic / anaerobic respiration HS-LS2-3	Student does not demonstrate a minimal understanding of the standard.	Student can construct and revise an explanation based on evidence for the cycling of matter and flow of energy in aerobic and anaerobic conditions.	Student can construct and revise an explanation based on provided evidence for the cycling of matter and flow of energy in aerobic and anaerobic conditions using the processes of photosynthesis and respiration.	Student can construct and revise an explanation based on collected evidence for the correlation between the processes of photosynthesis, respiration, and fermentation.	Student can construct and revise an explanation based on collected evidence for the electron transport chain and its relationship to the processes of photosynthesis, respiration, and fermentation.	Student demonstrates an understanding of the key concept beyond the advanced level and completes a teacher guided independent assignment such as a lab, research paper, class report, etc.
cycling of matter / flow of energy HS-LS2-4	Student does not demonstrate a minimal understanding of the standard.	Student can use mathematical representation to support claims for the cycling of matter and flow of energy among organisms in an ecosystem.	Student can use provided mathematical representation data to support biogeochemical cycles and pyramid models for the cycling of matter and flow of energy among organisms in an ecosystem.	Student can use mathematical representation from biogeochemical cycles and pyramid models for the support cycling of matter and flow of energy among organisms in an ecosystem.	Student can use mathematical representation from collected data to create biogeochemical cycles and pyramid models for the cycling of matter and flow of energy among organisms in an ecosystem.	Student demonstrates an understanding of the key concept beyond the advanced level and completes a teacher guided independent assignment such as a lab, research paper, class report, etc.
Respiration / Photosynthesis in cycling of matter / flow of energy HS-LS2-5	Student does not demonstrate a minimal understanding of the standard.	Student can develop a model to illustrate the role of photosynthesis and cellular respiration in the cycling of carbon among the biosphere, atmosphere, hydrosphere, and geosphere.	Student can use provided data and information to develop a model to illustrate the role of photosynthesis and cellular respiration in the cycling of carbon among the biosphere, atmosphere, hydrosphere, and geosphere.	Student can collect data through provided lab work or research to develop a model to illustrate the role of photosynthesis and cellular respiration in the cycling of carbon among the biosphere, atmosphere, hydrosphere, and geosphere.	Student can develop a model through directed lab work or research to illustrate the role of photosynthesis and cellular respiration in the cycling of carbon among the biosphere, atmosphere, hydrosphere, and geosphere.	Student demonstrates an understanding of the key concept beyond the advanced level and completes a teacher guided independent assignment such as a lab, research paper, class report, etc.

KEY CONCEPT

Interactions

	E	D	C	B	A	
Standard	**0-0.9**	**1 - Minimal Understanding**	**2 - Basic**	**3 - Proficient**	**4 - Advanced**	**5 - Exemplary**
Limiting Factors HS-LS2-1	Student does not demonstrate a minimal understanding of the standard.	Student can identify carrying capacity on a graph and identify the limiting factors for the population.	Student can analyze charts and graphs to determine the effect of various limiting factors and make predictions of future changes	Student can explain using data how limiting factors affect population size.	Student can evaluate data from different sources to explain how interdependent factors in the environment can come together to impact a population.	Student demonstrates an understanding of the key concept beyond the advanced level and completes a teacher guided independent assignment such as a lab, research paper, class report, etc.
Interactions HS-LS2-2	Student does not demonstrate a minimal understanding of the standard.	Student can collect data on factors affecting populations, graphically represent data and identify trends.	Student can identify trends between multiple sets of data and draw conclusions about present population size and how factors are affecting them.	Student can evaluate multiple data sets for population size to determine how the population is being affected and use the information to predict future effects on populations.	Student can identify an environmental factor that might affect a population and make a prediction about how the population will change. They can then collect and interpret data on the identified factor allowing them to support or revise their prediction.	Student demonstrates an understanding of the key concept beyond the advanced level and completes a teacher guided independent assignment such as a lab, research paper, class report, etc.
Interdependency HS-LS2-6	Student does not demonstrate a minimal understanding of the standard.	Student can explain how populations change in an ecosystem using at least two examples	Student can explain how populations change in an ecosystem using two examples that are interconnected.	Student can explain what interactions help to keep populations at consistent numbers and propose an example of a changing condition which might alter the stability of the population.	Student can explain what interactions help to keep populations at consistent numbers and propose an example of a changing condition which might alter the stability of the population. They can then design a model to show the effect.	Student demonstrates an understanding of the key concept beyond the advanced level and completes a teacher guided independent assignment such as a lab, research paper, class report, etc.

Identify Human Impact HS-LS2-7	Student does not demonstrate a minimal understanding of the standard.	Student can identify a human impact on the environment based on data given and then suggest a possible solution.	Student can identify a human impact on the environment given data, suggest a possible solution and design an experiment to test it.	Student can identify a human impact on the environment, research data to determine the environmental impact, suggest a possible solution and design an experiment to test it.	Student can identify a human impact on the environment, research data to determine the environmental impact, suggest a possible solution, and design an experiment to test it. Then explain any subsequent impacts the solution might have on the environment.	Student demonstrates an understanding of the key concept beyond the advanced level and completes a teacher guided independent assignment such as a lab, research paper, class report, etc.
Test Human Impact HS-LS4-6	Student does not demonstrate a minimal understanding of the standard.	Student can use data to evaluate human impact.	Student can collect data on the effects of a human impact	Student can collect and analyze data to understand the effects of human activity on biodiversity.	Student can create or revise a simulation to test a solution to mitigate adverse impacts of human activity on biodiversity.	Student demonstrates an understanding of the key concept beyond the advanced level and completes a teacher guided independent assignment such as a lab, research paper, class report, etc.

KEY CONCEPT

STRUCTURES AND PROCESSES

	E	D	C	B	A	
Standard	**0-0.9**	**1 - Minimal Understanding**	**2 - Basic**	**3 - Proficient**	**4 - Advanced**	**5 - Exemplary**
Hierarchical Organization HS-LS1-2	Student does not demonstrate a minimal understanding of the standard.	Student can develop and use a model to illustrate the hierarchical organization of multicellular organisms.	Student can differentiate what basic functions of life occur at which level of organization.	Students can explain how different organ systems can work together at the organismal level.	Students can explain how different organ systems can work together at the organismal level.	Student demonstrates an understanding of the key concept beyond the advanced level and completes a teacher guided independent assignment such as a lab, research paper, class report, etc.
Feedback Mechanisms / Homeostasis HS-LS1-3	Student does not demonstrate a minimal understanding of the standard.	Student can develop and use a model to illustrate evidence that feedback mechanisms maintain homeostasis.	Student can explain homeostasis mechanisms and how maintain homeostasis is important to living organisms	Student can provide specific examples of homeostasis mechanisms and how they maintain homeostasis.	Student can provide specific examples of homeostasis mechanisms and how they maintain homeostasis as well as differentiate between positive and negative feedback loops.	Student demonstrates an understanding of the key concept beyond the advanced level and completes a teacher guided independent assignment such as a lab, research paper, class report, etc.
cellular division / mitosis / differentiation HS-LS1-4	Student does not demonstrate a minimal understanding of the standard.	Student can explain the role of cellular division (mitosis) and cellular differentiation	Students can differentiate between mitosis, meiosis and cell differentiation.	Students can recognize the process of mitosis vs. cellular differentiation.	Given a model of mitosis or cell division students can explain each process and place the stages in the correct sequence.	Student demonstrates an understanding of the key concept beyond the advanced level and completes a teacher guided independent assignment such as a lab, research paper, class report, etc.

KEY CONCEPT

DNA Structure and Protein Synthesis

	E	D	C	B	A	
Standard	**0-0.9**	**1 - Minimal Understanding**	**2 - Basic**	**3 - Proficient**	**4 - Advanced**	**5 - Exemplary**
Structure / Protein synthesis HS-LS1-1	Student does not demonstrate a minimal understanding of the standard.	Student can explain that genes are sections of DNA that carry the instruction for building proteins.	Student can explain that genes are sections of DNA that carry the instructions for building proteins and the Central Dogma.	Student can determine a protein's amino acid sequence when given a section of DNA. The student can then explain the role of proteins in cellular functions.	Student can analyze two DNA sequences for the presence of mutations, determine the corresponding amino acid sequences and explain possible effects on the protein being produced.	Student demonstrates an understanding of the key concept beyond the advanced level and completes a teacher guided independent assignment such as a lab, research paper, class report, etc.
Proteins / Traits HS-LS3-1	Student does not demonstrate a minimal understanding of the standard.	Student can explain the relationship between proteins and traits.	Student can explain the relationship between proteins and traits and how they are passed down from parent to offspring.	Student can explain the relationship between proteins and traits and the role of meiosis in passing down the traits form parent to offspring.	Student can explain the relationship between proteins and traits and the role of meiosis in the passing of traits for parent to offspring. Student can also explain how mistakes during meiosis can affect the process.	Student demonstrates an understanding of the key concept beyond the advanced level and completes a teacher guided independent assignment such as a lab, research paper, class report, etc.

KEY CONCEPT

Inheritance

	E	D	C	B	A	
Standard	**0-0.9**	**1 - Minimal Understanding**	**2 - Basic**	**3 - Proficient**	**4 - Advanced**	**5 - Exemplary**
Genetic Variation HS-LS3-2	Student does not demonstrate a minimal understanding of the standard.	Student can explain that new genetic combinations can arise through meiosis, replication errors or environmentally induced mutations.	Student can explain 1 of the 3 methods of genetic variation in detail as the method relates to how new genetic material comes about.	Student can explain 2 of the 3 methods of genetic variation in detail as the method relates to how new genetic material comes about.	Student can explain all 3 methods of genetic variation in detail as the method relates to how new genetic material comes about.	Student demonstrates an understanding of the key concept beyond the advanced level and completes a teacher guided independent assignment such as a lab, research paper, class report, etc.
Statistics / Probability of Variation HS-LS2-2	Student does not demonstrate a minimal understanding of the standard.	Student can apply statistics and probability to explain the variation and distribution of traits in a population when given organisms genotypes, using a Punnett square.	Student can apply statistics and probability to explain the variation and distribution of traits in a population when given an organisms' phenotypes and limited genotype information, using a Punnett square.	Student can apply statistics and probability to explain the variation and distribution of traits in a population when given only a description of organisms' phenotypes, using a Punnett square. No genetic key is provided	Student can create Punnett squares, evaluate and instruct others concerning statistics and probability to explain the variation and distribution of traits in a population using the student created Punnett squares.	Student demonstrates an understanding of the key concept beyond the advanced level and completes a teacher guided independent assignment such as a lab, research paper, class report, etc.

KEY CONCEPT

EVIDENCE FOR EVOLUTION

	E	D	C	B	A	
Standard	**0-0.9**	**1 - Minimal Understanding**	**2 - Basic**	**3 - Proficient**	**4 - Advanced**	**5 - Exemplary**
common ancestry HS-LS4-1	Student does not demonstrate a minimal understanding of the standard.	Student can explain the four main evidences supporting the common ancestry of all living things.	Student can explain the rational for each type of evidence.	Student can give examples of each type of evidence and explain how they show common ancestry.	Student can explain or show how the four main evidences supporting common ancestry are present in modern day organisms and their ancestors.	Student demonstrates an understanding of the key concept beyond the advanced level and completes a teacher guided independent assignment such as a lab, research paper, class report, etc.
process of evolution HS-LS4-2	Student does not demonstrate a minimal understanding of the standard.	Student can explain Darwin's four principles of natural selection. .	Student can construct an explanation that the process of evolution primarily results from natural selection.	Student can use real life examples of organisms showing Darwin's four principles of natural selection.	Student can make predictions on how a population would change over time based on Darwin's four principles of natural selection.	Student demonstrates an understanding of the key concept beyond the advanced level and completes a teacher guided independent assignment such as a lab, research paper, class report, etc.
allele frequency showing evolution HS-LS4-3	Student does not demonstrate a minimal understanding of the standard.	Student can collect data demonstrating changes in allele frequency due to environmental influences.	Student can use numerical information to support that organisms with favorable inheritable traits tend to increase in proportion to organisms lacking this trait.	Student can analyze collected data demonstrating changes in allele frequency due to environmental influences and show the affect graphically.	Student can predict and explain future trends in allele frequencies using data.	Student demonstrates an understanding of the key concept beyond the advanced level and completes a teacher guided independent assignment such as a lab, research paper, class report, etc.

KEY CONCEPT

PROCESSES OF EVOLUTION

	E	D	C	B	A	
Standard	**0-0.9**	**1 - Minimal Understanding**	**2 - Basic**	**3 - Proficient**	**4 - Advanced**	**5 - Exemplary**
natural selection HS-LS4-4	Student does not demonstrate a minimal understanding of the standard.	Student can explain the four components of natural selection	Student can give examples of natural selection.	Student can construct an explanation based on evidence for how natural selection leads to adaptation of populations	Student can construct an explanation based on all four principles of natural selection using an example.	Student demonstrates an understanding of the key concept beyond the advanced level and completes a teacher guided independent assignment such as a lab, research paper, class report, etc.
speciation HS-LS4-5	Student does not demonstrate a minimal understanding of the standard.	Students can explain with an example how environmental conditions lead to speciation.	Student can explain the three possible results of speciation: (1) increases in the number of individuals of some species, (2) the emergence of new species over time, and (3) the extinction of other species	Student can evaluate the evidence supporting claims that changes in environmental conditions may result in: (1) increases in the number of individuals of some species, (2) the emergence of new species over time, and (3) the extinction of other species	Student can evaluate species and population data and relate it to a speciation event.	Student demonstrates an understanding of the key concept beyond the advanced level and completes a teacher guided independent assignment such as a lab, research paper, class report, etc.
group behavior HS-LS2-8	Student does not demonstrate a minimal understanding of the standard.	Student can distinguish between group and individual behaviors.	Students can explain that different behaviors can affect individual species chances to survive and reproduce.	Student can give example of group and individual behaviors that are negative or positive.	Student can evaluate the evidence for the role of group behavior on individual and species' chances to survive and reproduce.	Student demonstrates an understanding of the key concept beyond the advanced level and completes a teacher guided independent assignment such as a lab, research paper, class report, etc.