Michigan Alternate Content Standards - Science

Life Science: Grades 9-12

Structure and Function

1 **Demonstrate that the structure of DNA determines the structure of proteins that are used to carry out cell functions.** EE.HS-LS1-1

- H Demonstrate that the structure of DNA determines the structure of proteins that are used to carry out cell functions. EE.HS-LS1-H.1
- M Demonstrate that the cell has a specific structure called DNA, which contains information to perform cellular functions. EE.HS-LS1-M.1
- L Identify which is a living thing and made of cells. EE.HS-LS1-L.1

2 **Use models to illustrate the interaction of two body systems that provides specific functions.** EE.HS-LS1-2

- H Use models to illustrate the interaction of two body systems that provides specific functions. EE.HS-LS1-H.2
- M Use models to identify the main organs or organ systems of familiar animals. EE.HS-LS1-M.2
- L Given a model of a human organ system, identify the organ that performs a specific function. EE.HS-LS1-L.2

3 **Use an investigation to provide evidence that organisms react to change to regulate their internal conditions needed to stay alive.** EE.HS-LS1-3

- H Use an investigation to provide evidence that organisms react to change to regulate their internal conditions needed to stay alive. EE.HS-LS1-H.3
- M Use evidence to identify ways that animals regulate their internal conditions needed to stay alive. EE.HS-LS1-M.3
- L Given a change, identify one or more ways a human would react to stay alive. EE.HS-LS1-L.3

Matter and Energy in Organisms and Ecosystems

1 **Use a model to illustrate how the process of photosynthesis transforms light energy, carbon dioxide, and water into chemical energy (sugar) for organisms to use.** EE.HS-LS1-5

- H Use a model to illustrate how the process of photosynthesis transforms light energy, carbon dioxide, and water into chemical energy (sugar) for organisms to use. EE.HS-LS1-H.5
- M Use a model to communicate that sunlight, carbon dioxide, and water transform into sugar for plants to use as food. EE.HS-LS1-M.5

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L Use a model to identify that light energy is needed for a plant to make and store food (sugar). EE.HS-LS1-L.5

2 **Use models to show that common elements (C, H, O) can form bigger molecules such as carbohydrates, proteins, lipids, and nucleic acids.** EE.HS-LS1-6

H Use models to show that common elements (C, H, O) can form bigger molecules such as carbohydrates, proteins, lipids, and nucleic acids. EE.HS-LS1-H.6

M Identify foods that are classified as sources of carbohydrates (carbs) or sources of proteins. EE.HS-LS1-M.6

L Sort foods into different groups or identify foods that belong to a given food group. EE.HS-LS1-L.6

3 **Use a model to describe that the process of cellular respiration transforms food molecules and oxygen molecules into a new substance, which results in the energy used by organisms to grow and survive.** EE.HS-LS1-7

H Use a model to describe that the process of cellular respiration transforms food molecules and oxygen molecules into a new substance, which results in the energy used by organisms to grow and survive. EE.HS-LS1-H.7

M Use a model to identify that cells break down food into new substances to provide energy for plants or animals to grow and survive. EE.HS-LS1-M.7

L Use a model to identify that food is a source of energy for humans to grow and survive. EE.HS-LS1-L.7

4 **Use models to describe the flow of energy and conservation of matter among organisms of an ecosystem.** EE.HS-LS2-4

H Use models to describe the flow of energy and conservation of matter among organisms of an ecosystem. EE.HS-LS2-H.4

M Use a simple model to describe a simple food chain. EE.HS-LS2-M.4

L Given a simple model of a familiar ecosystem, identify one member of a food chain that is consumed by another. EE.HS-LS2-L.4

5 **Use models to illustrate the cycling of carbon among living organisms, air, water, and soil.** EE.HS-LS2-5

H Use models to identify the cycling of carbon among living organisms, air, water, and soil. EE.HS-LS2-H.5

M Given a simple carbon cycle model, identify the flow of carbon between air and living organisms. EE.HS-LS2-M.5

L Given a familiar model, recognize that plants give humans oxygen and humans give plants carbon dioxide. EE.HS-LS2-L.5

Interdependent Re Ec

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1 **Use graphs and/or data to explain the causeand-effect relationship among opulation sizes and available resources (food, shelter, water).** EE.HS-LS2-1-2-6

I Use graphs and/or data to explain the causeand-effect relationship among population sizes and available resources (food, shelter, water). EE.HS-LS2-H.1-2-6

M Use a simple graph to identify possible causes of a change in population of organisms (food, shelter, water). EE.HS-LS2-M.1-2-6

L Use a simple graph to identify a cause for the change in a population of organisms. EE.HS-LS2-L.1-2-6

2 **Use data to select a solution for reducing the impact of human activities on a given an environmental condition.** EE.HS-LS2-7_4-6

H Use data to select a solution for reducing the impact of human activities on a given environmental condition. EE.HS-LS2-7_4-H.6

M Differentiate between human activities that are harmful or beneficial to the environment. EE.HS-LS2-7_4-M.6

L Identify a human activity that helps the environment. EE.HS-LS2-7_4-L.6

3 **Use evidence to describe how group behavior affects the survival of groups of animals and individual animals.** EE.HS-LS2-8

H Use evidence to describe how group behavior affects the survival of groups of animals and individual animals. EE.HS-LS2-H.8

M Given information or a scenario, identify the group behavior that is beneficial to groups of animals and individual animals. EE.HS-LS2-M.8

L Identify a group behavior that increases an individual animal's chances for survival. EE.HS-LS2-L.8

Inheritance and Variation of Traits

1 **Use a model to identify the role of cellular division and specialization of cells as the body grows and develops.** EE.HS-LS1-4

H Use a model to identify the role of cellular division and specialization of cells as the body grows and develops. EE.HS-LS1-H.4

M Use a model to identify the role of cellular division in growing or maintaining the body. EE.HS-LS1-M.4

L Recognize that body growth and/or repair is a result of dividing cells. EE.HS-LS1-L.4

2 **Use models and/or illustrations to explain that offspring receive half of their genetic information from each parent resulting in offspring that look similar but not identical to the parents.** EE.HS-LS3-1-2

H Use models and/or illustrations to explain that offspring receive half of their genetic information from each parent resulting in offspring that look similar but not identical to the parents. EE.HS-LS3-H.1-2

M Use models or illustrations to identify or predict physical traits passed from parent to offspring. EE.HS-LS3-M.1-2

L Identify parent and offspring combinations. EE.HS-LS3-L.1-2

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Evolution

Use data to find patterns in the fossil record that demonstrate similarities and/or differences as organisms change over time. EE.HS-LS4-1

H Use data to find patterns in the fossil record that demonstrate similarities and/or differences as organisms change over time. EE.HS-LS4-H.1

M Given pictures of fossils and their modern descendants, identify similarities or differences in their traits. EE.HS-LS4-M.1

L Given a fossil and two organisms, match the fossil to the organism that is related. EE.HS-LS4-2L.1

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2 **Use evidence to explain that evolution is the result of the number of organisms with beneficial traits increasing due to their ability to survive (e.g., get more food, escape predators) which causes the number of organisms without the beneficial traits to decrease.** EE.HS-LS4-2-5

H Use evidence to explain that evolution is the result of the number of organisms with beneficial traits increasing due to their ability to survive (e.g., get more food, escape predators) which causes the number of organisms without the beneficial traits to decrease. EE.HS-LS4-H.2-5

M Given data, identify the beneficial traits (that will also be passed on to offspring) of an organism that make it more likely to survive in a particular environment or as an environment changes. EE.HS-LS4-M.2-5

L Given an environment and two vastly different organisms, identify which organism has the ability to survive in that environment. EE.HS-LS4-L.2-5