**State Standard for General Education**

| HS-LS1-1 | 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 |

| DLM Essential Element |

| EE.HS-LS1-1 | Explain how different organs of the body carry out essential functions of life |

| Linkage Levels |

| Initial: |

- Identify major organs of the body |

| Precursor: |

- Indicate the function of major organs of the body |

| Target: |

- Explain how different organs of the body carry out essential functions of life |

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A diagram showing the relationship of linkage levels in the mini-map appears below.

*Key to map codes in upper right corner of linkage level boxes:*

- I Initial
- P Precursor
- T Target
SCI.EE.HS-LS1-1 Explain how different organs of the body carry out essential functions of life.
ESSENTIAL ELEMENT, LINKAGE LEVELS, AND MINI-MAP
SCIENCE: HIGH SCHOOL
SCI.EE.HS-LS1-2

<table>
<thead>
<tr>
<th>State Standard for General Education</th>
<th>DLM Essential Element</th>
<th>Linkage Levels</th>
</tr>
</thead>
<tbody>
<tr>
<td>HS-LS1-2</td>
<td>EE.HS-LS1-2</td>
<td>Initial:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Recognize that different organs have different functions</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>Precursor:</strong></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Identify which organs work for a specific function</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>Target:</strong></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Use a model to illustrate the organization and interaction of major organs into systems (e.g., circulatory, respiratory, digestive, sensory) in the body to provide specific functions</td>
</tr>
</tbody>
</table>

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*Key to map codes in upper right corner of linkage level boxes:*

- I  Initial
- P  Precursor
- T  Target
Use a model to illustrate the organization and interaction of major organs into systems (e.g., circulatory, respiratory, digestive, sensory) in the body to provide specific functions.

Sci-90
Recognize that different organs have different functions.

Sci-89
Identify which organs work for a specific function.

Sci-88
Use a model to illustrate the organization and interaction of major organs into systems in the body to provide specific functions.
## State Standard for General Education

<table>
<thead>
<tr>
<th>HS-LS1-3</th>
<th>EE.HS-LS1-3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plan and conduct an investigation to provide evidence that feedback mechanisms maintain homeostasis</td>
<td>Collect data from an investigation to show how different organisms react to changes (e.g., heart rate increases with exercise, pupils react to light)</td>
</tr>
</tbody>
</table>

## Linkage Levels

**Initial:**
- Identify changes in the data display (e.g., objects, pictures, graphs, charts, etc.)

**Precursor:**
- Compare before and after data on changes that occur to an organism

**Target:**
- Collect data from an investigation to show how different organisms react to changes (e.g., heart rate increases with exercise, pupils react to light)

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A diagram showing the relationship of linkage levels in the mini-map appears below.

**Key to map codes in upper right corner of linkage level boxes:**

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>Initial</td>
</tr>
<tr>
<td>P</td>
<td>Precursor</td>
</tr>
<tr>
<td>T</td>
<td>Target</td>
</tr>
</tbody>
</table>
Collect data from an investigation to show how different organisms react to changes (e.g., heart rate increases with exercise, pupils react to light).

Sci-87
Identify changes in the data display (e.g., objects, pictures, graphs, charts, etc.).

Sci-86
Compare before and after data on changes that occur to an organism.

Sci-85
Collect data from an investigation to show how different organisms react to changes.
## ESSENTIAL ELEMENT, LINKAGE LEVELS, AND MINI-MAP

### SCIENCE: HIGH SCHOOL BIOLOGY

### SCI.EE.HS-LS1-4

<table>
<thead>
<tr>
<th>State Standard for General Education</th>
<th>DLM Essential Element</th>
<th>Linkage Levels</th>
</tr>
</thead>
<tbody>
<tr>
<td>HS-LS1-4</td>
<td>EE.HS-LS1-4</td>
<td>Initial:</td>
</tr>
<tr>
<td>Use a model to illustrate the role of cellular division (mitosis) and differentiation in producing and maintaining complex organisms</td>
<td>Use a model to illustrate how growth occurs when cells multiply</td>
<td>- Recognize that organisms are composed of cells</td>
</tr>
</tbody>
</table>

**Precursor:**
- Use a model to relate the number of cells to the size of a body

**Target:**
- Use a model to illustrate how growth occurs when cells multiply

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A diagram showing the relationship of linkage levels in the mini-map appears below.

*Key to map codes in upper right corner of linkage level boxes:*

- I Initial
- P Precursor
- T Target
Use a model to illustrate how growth occurs when cells multiply.
## ESSENTIAL ELEMENT, LINKAGE LEVELS, AND MINI-MAP

**SCIENCE: HIGH SCHOOL BIOLOGY**

**SCI.EE.HS-LS2-1**

<table>
<thead>
<tr>
<th>State Standard for General Education</th>
<th>DLM Essential Element</th>
<th>Linkage Levels</th>
</tr>
</thead>
<tbody>
<tr>
<td>HS-LS2-1</td>
<td>EE.HS-LS2-1</td>
<td></td>
</tr>
<tr>
<td>Use mathematical and/or computational representations to support explanations of factors that affect carrying capacity of ecosystems at different scales</td>
<td>Use a graphical representation to explain changes over time in the population size of an animal species (e.g., currently on the endangered list)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Initial:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Recognize that there was a change in the population size</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Precursor:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Use a graphical representation to show changes in population size</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Target:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Use a graphical representation to explain changes over time in the population size of an animal species (e.g., currently on the endangered list)</td>
</tr>
</tbody>
</table>

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A diagram showing the relationship of linkage levels in the mini-map appears below.

**Key to map codes in upper right corner of linkage level boxes:**

- **I** Initial
- **P** Precursor
- **T** Target
SCI.EE.HS-LS2-1 Use a graphical representation to explain changes over time in the population size of an animal species (e.g., currently on the endangered list).
<table>
<thead>
<tr>
<th>State Standard for General Education</th>
<th>DLM Essential Element</th>
<th>Linkage Levels</th>
</tr>
</thead>
</table>
| **HS-LS2-2** Use mathematical representations to support and revise explanations based on evidence about factors affecting biodiversity and populations in ecosystems of different scales | **EE.HS-LS2-2** Use a graphical representation to explain the dependence of an animal population on other organisms for food and their environment for shelter | **Initial:**  
- Identify food and shelter needs for familiar wildlife  
**Precursor:**  
- Recognize the relationship between population size and available resources for food and shelter from a graphical representation  
**Target:**  
- Use a graphical representation to explain the dependence of an animal population on other organisms for food and their environment for shelter |

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A diagram showing the relationship of linkage levels in the mini-map appears below.

*Key to map codes in upper right corner of linkage level boxes:*

- **I** Initial
- **P** Precursor
- **T** Target
Use a graphical representation to explain the dependence of an animal population on other organisms for food and their environment for shelter.

Sci-78
Identify food and shelter needs for familiar wildlife.

Sci-77
Recognize the relationship between population size and available resources from a graphical representation.

Sci-76
Use a graphical representation to explain the dependence of an animal population on other organisms.
## ESSENTIAL ELEMENT, LINKAGE LEVELS, AND MINI-MAP

### SCIENCE: HIGH SCHOOL BIOLOGY

**SCI.EE.HS-LS3-2**

<table>
<thead>
<tr>
<th>State Standard for General Education</th>
<th>DLM Essential Element</th>
<th>Linkage Levels</th>
</tr>
</thead>
<tbody>
<tr>
<td>HS-LS3-2</td>
<td>EE.HS-LS3-2</td>
<td>Initial:</td>
</tr>
<tr>
<td>Make and defend a claim based on</td>
<td>Defend why reproduction</td>
<td>Make a claim supported by evidence that</td>
</tr>
<tr>
<td>evidence that inheritable genetic</td>
<td>may or may not result</td>
<td>parents and offspring may have different</td>
</tr>
<tr>
<td>variations may result from (1) new</td>
<td>in offspring with</td>
<td>traits</td>
</tr>
<tr>
<td>genetic combinations through</td>
<td>different traits</td>
<td></td>
</tr>
<tr>
<td>meiosis, (2) viable errors</td>
<td></td>
<td></td>
</tr>
<tr>
<td>occurring during replication, and/or</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(3) mutations caused by environmental</td>
<td></td>
<td></td>
</tr>
<tr>
<td>factors</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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A diagram showing the relationship of linkage levels in the mini-map appears below.

*Key to map codes in upper right corner of linkage level boxes:*

- I Initial
- P Precursor
- T Target
Defend why reproduction may or may not result in offspring with different traits.

Sci-75
Compare traits of parents and offspring.

Sci-74
Make a claim supported by evidence that parents and offspring may have different traits.

Sci-73
Defend why reproduction may or may not result in offspring with different traits.
Construct an explanation based on evidence that the process of evolution primarily results from four factors: (1) the potential for a species to increase in number, (2) the heritable genetic variation of individuals in a species due to mutation and sexual reproduction, (3) competition for limited resources, and (4) the proliferation of those organisms that are better able to survive and reproduce in the environment.

Initial:
- Match particular species to their various environments

Precursor:
- Identify factors in an environment that require special traits to survive

Target:
- Explain how the traits of particular species allow them to survive in their specific environments

A diagram showing the relationship of linkage levels in the mini-map appears below.

**Key to map codes in upper right corner of linkage level boxes:**

- I Initial
- P Precursor
- T Target
SCI.EE.HS-LS4-2 Explain how the traits of particular species allow them to survive in their specific environments.

Sci-72
Match particular species to their various environments.

Sci-71
Identify factors in an environment that require special traits to survive.

Sci-70
Explain how the traits of particular species allow them to survive in their specific environments.
## ESSENTIAL ELEMENT, LINKAGE LEVELS, AND MINI-MAP
### SCIENCE: HIGH SCHOOL BIOLOGY
#### SCI.EE.HS-LS4-3

<table>
<thead>
<tr>
<th>State Standard for General Education</th>
<th>DLM Essential Element</th>
<th>Linkage Levels</th>
</tr>
</thead>
<tbody>
<tr>
<td>HS-LS4-3</td>
<td>EE.HS-LS4-3</td>
<td>Initial:</td>
</tr>
<tr>
<td>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</td>
<td>Interpret data sets to identify an advantageous heritable trait</td>
<td>• Recognize that some organisms survive better in certain environments</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Precursor:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Using data sets, identify organisms that would survive better in certain environment</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Target:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Interpret data sets to identify an advantageous heritable trait</td>
</tr>
</tbody>
</table>

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**Key to map codes in upper right corner of linkage level boxes:**

I  Initial  
P  Precursor  
T  Target
Interpret data sets to identify an advantageous heritable trait.

Sci-69
Recognize that some organisms survive better in certain environments.

Sci-68
Using data sets, identify organisms that would survive better in certain environment.

Sci-67
Interpret data sets to identify an advantageous heritable trait.
## ESSENTIAL ELEMENT, LINKAGE LEVELS, AND MINI-MAP
### SCIENCE: HIGH SCHOOL BIOLOGY
#### SCI.EE.HS-LS4-6

<table>
<thead>
<tr>
<th>State Standard for General Education</th>
<th>DLM Essential Element</th>
<th>Linkage Levels</th>
</tr>
</thead>
<tbody>
<tr>
<td>HS-LS4-6</td>
<td>EE.HS-LS4-6</td>
<td>Initial:</td>
</tr>
<tr>
<td>Create or revise a simulation to test a solution to mitigate adverse impacts of human activity on biodiversity</td>
<td>Evaluate a strategy to protect a species</td>
<td>- Identify a human activity that has an effect on a species</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Precursor:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Using a mathematical model, determine which human actions help or harm a species</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Target:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Evaluate a strategy to protect a species</td>
</tr>
</tbody>
</table>

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A diagram showing the relationship of linkage levels in the mini-map appears below.

Key to map codes in upper right corner of linkage level boxes:

- I  Initial
- P  Precursor
- T  Target
Evaluate a strategy to protect a species.

Sci-66
Identify a human activity that has an effect on a species.

Sci-65
Using a mathematical model, determine which human actions help or harm a species.

Sci-64
Evaluate a strategy to protect a species.