Connecticut Alternate Science Assessment

Grade 11 Performance Tasks

Life Science

Storyline 3: Living Organisms

Storyline 4: Healthy Ecosystems

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Connecticut Alternate Science Assessment

Life Science

Storyline 3: Living Organisms

Grade 11 Performance Task

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Guiding Questions: What are the organ systems and how are organ systems structured to promote survival? How does the human body maintain balance in order to survive? How are cells related to the complexity of an organism?

NGSS Learning Progressions	Grade 11		
	NGSS Standard Performance Expectations	**Connecticut Alternate Science Essence Statements**	**Core Extensions**
LS1.A Structure and Function	HS-LS1-2 Develop and use a model to illustrate the hierarchical organization of interacting systems that provide specific functions within multicellular organisms. HS-LS1-3 Plan and conduct an investigation to provide evidence that feedback mechanisms maintain homeostasis.	CTAS-HS-LS1-2 Use a model to show how the parts of a human organ system (e.g., nervous, muscular, circulatory, digestive, reproductive) and organ systems work together to perform functions. CTAS-HS-LS1-3 Use the results of an investigation as evidence that living systems respond to external change in order to maintain balance and survive.	1. Identify the basic function of one human organ system. (CTAS-HS-LS1-2) 2. Use a model to show how two organ systems work together to perform a function. (CTAS-HS-LS1-2) 3. Identify the human body system or system component and the way that it supports the human body (e.g., identify the system or organ that supports breathing, lungs/respiratory system). (CTAS-HS-LS1-2) 4. Use a model to relate the number of cells to the size of an organism. (CTAS-HS-LS1-4) 5. Use a model to show that as the complexity of an organism increases, so does the number, type, and specialization of cells. (CTAS-HS-LS1-4) 6. Given an external change, identify the organism's response to the change increasing opportunities for survival (e.g., humans sweat to cool body when it is hot). (CTAS-HS-LS1-3)
LS1.B Growth and Development of Organisms	HS-LS1-4 Use a model to illustrate the role of cellular division (mitosis) and differentiation in producing and maintaining complex organisms.	CTAS-HS-LS1-4 Use a model to show how cell changes (e.g., maintenance through division, differentiation, or multiplication) result in changes to the organism (e.g., growth, complexity).	

NGSS Learning Progressions	Grade 11		
	NGSS Standard Performance Expectations	**Connecticut Alternate Science Essence Statements**	**Core Extensions**
			7. Provided the results of an investigation, make a claim about the body's ability to maintain balance of a vital feature (i.e., temperature, heart rate, breathing rate). (CTAS-HS-LS1-3)
Appropriate Vocabulary	Organism, function, organ, organ system, survival, temperature, heart rate, breathing rate, cell, growth, waste, nutrients, absorbed, circulatory system, heart, artery, vein, absorbs, complexity, respiratory system, skeletal system, muscular system, bones, blood, complex		

Life Science
Storyline 3: Living Organisms
Grade 11 Performance Task

General Overview:
Students will complete a series of activities focused on human body systems, maintaining balance or homeostasis in the human body, and the complexity of organisms relative to their size. Students will identify the primary functions and relationships of human body systems. Students will evaluate the complexity of different organisms in terms of the number of cells. Students will investigate how the human body maintains balance or homeostasis given an external change and during exercise.

List of Materials Needed:
Teacher-Provided Resources:
There are no Teacher-Provided Resources that are required for this Performance Task.

Instructions for Preparing Materials:
Teachers must collect all relevant materials prior to the administration of each activity. The Card, Sentence Strip, and Strip Resources will need to be cut out. Resources are listed according to the Resource Identifier, which appears on the back of each Resource. The Resources needed for the administration of each activity are listed according to these Resource Identifiers in the Teacher Notes section of each activity.

List of Resources:
- Activity 1 Resource 1: Parts of the Digestive System Poster
- Activity 1 Resource 2: Cards 2a – 2d
    - Card 2a – nutrients
    - Card 2b – blood
    - Card 2c – bones
    - Card 2d – organs
- Activity 2 Resource 1a: Skeletal System Poster
- Activity 2 Resource 1b: Muscular System Poster
- Activity 2 Resource 1c: Skeletal and Muscular Systems Working Together Poster
- Activity 2 Resource 2: Cards 2a – 2d
    - Card 2a – feel heat
    - Card 2b – smell flowers
    - Card 2c – think of ideas
    - Card 2d – raise a hand
- Activity 3 Resource 1: Respiratory System Poster
- Activity 3 Resource 2: Circulatory System Poster
- Activity 3 Resource 3: Strips 3a – 3c
    - Strip 3a – breathing of air
    - Strip 3b – blood throughout the body
    - Strip 3c – food to be digested

- Activity 4 Resource 1: Three Organisms Poster
- Activity 4 Resource 2: Cards 2a – 2c
    - Card 2a – dog
    - Card 2b – human
    - Card 2c – mouse
- Activity 5 Resource 1: Organisms Poster
- Activity 5 Resource 2: Cards 2a – 2c
    - Card 2a – Humans
    - Card 2b – Bacteria
    - Card 2c – Plants
- Activity 5 Resource 3: Sentence Strips 3a – 3c
    - Sentence Strip 3a – humans and plants more complex
    - Sentence Strip 3b – bacteria more complex
    - Sentence Strip 3c – plants as complex
- Activity 6 Resource 1: Cards 1a – 1d
    - Card 1a – winter
    - Card 1b – shiver
    - Card 1c – sweat
    - Card 1d – yawn
- Activity 7 Resource 1: Student Running Poster
- Activity 7 Resource 2: Heart Rate and Breathing Rate Before and During the Run Data Table Poster
- Activity 7 Resource 3: Strips 3a – 3c
    - Strip 3a – digest food
    - Strip 3b – breathe air
    - Strip 3c – pump blood

ACTIVITY 1

Essence Statement: CTAS-HS-LS1-2 Use a model to show how the parts of a human organ system (e.g., nervous, muscular, circulatory, digestive, reproductive) and organ systems work together to perform functions.

Core Extension 1: Identify the basic function of one human organ system. (CTAS-HS-LS1-2)

Teacher Notes:

Collect the following resources for this activity:

- Activity 1 Resource 1: Parts of the Digestive System Poster
- Activity 1 Resource 2: Cards 2a – 2d
  - Card 2a – nutrients
  - Card 2b – blood
  - Card 2c – bones
  - Card 2d – organs

Steps to Follow:

1. | **SAY** | "In this activity, we are going to talk about the digestive system." |
2. Display Resource 1: Parts of the Digestive System Poster for the student.
3. Indicate Resource 1.

SAY	"Here is a picture that shows different parts of the digestive system. The main function of the digestive system is to change food into energy the body uses. The digestive process starts when you chew and swallow food in your mouth *(indicate mouth)*. Then the food moves through the esophagus (*indicate esophagus*) to your stomach where it is broken down into smaller pieces *(indicate stomach)*. Next, the smaller pieces move down through your small intestine *(indicate small intestine)*. After the small intestine comes the large intestine *(indicate large intestine)*, where things that the body does not need are collected. Finally, the unneeded waste is removed from the body through the anus *(indicate anus)*."

4. | **SAY** | "The basic function of the digestive system is to change food into energy the body uses." |
5. | **ASK** | "What does the digestive system do?" |
6. Provide Resource 2: Cards 2a – 2d to the student. Indicate and read each Card.
   a. Indicate Card 2a.

SAY	"absorbs nutrients"

   b. Indicate Card 2b.

SAY	"absorbs blood"

c. Indicate Card 2c.

SAY	"absorbs bones"

d. Indicate Card 2d.

SAY	"absorbs organs"

7.

ASK AGAIN	"What does the digestive system do?"

8. Allow student to respond and record response. If no response or if incorrect response, proceed to scaffolding instructions.

9. Indicate Card 2a.

SAY	"The digestive system absorbs nutrients from food."

10.

SAY	"We are now finished with this activity."

Scoring Guidance and Scaffolding

Scaffolding:

1. After student makes first incorrect attempt, remove the incorrect Card chosen by the student.

SAY	"[Insert description of incorrect Card chosen by the student] is not the correct answer."

2.

ASK	"What does the digestive system do?"

3. Provide remaining Resource 2: Cards 2a – 2d to the student. Indicate and read each remaining Card.

a. Indicate Card 2a.

SAY	"absorbs nutrients"

b. Indicate Card 2b.

SAY	"absorbs blood"

c. Indicate Card 2c.

SAY	"absorbs bones"

d. Indicate Card 2d.

SAY	"absorbs organs"

4. | **ASK AGAIN** | "What does the digestive system do?" |

5. Allow student to respond and record response.

6. Indicate Card 2a.

| **SAY** | "The digestive system absorbs nutrients from food." |

7. | **SAY** | "We are now finished with this activity." |

The correct answer is as follows:

1. What does the digestive system do?
    a. Card 2a – absorbs nutrients

Content Guidance	Rating	Score
Student… • gives NO response. **OR** • is unable to identify that the digestive system absorbs nutrients (Card 2a).	The student **does not** demonstrate understanding.	0
Student… • **after scaffolding,** is able to identify that the digestive system absorbs nutrients (Card 2a).	The student demonstrates limited understanding typically requiring additional support through scaffolding.	1
Student… • is able to identify that the digestive system absorbs nutrients (Card 2a).	The student demonstrates understanding independently without scaffolding.	2

ACTIVITY 2

Essence Statement: CTAS-HS-LS1-2 Use a model to show how the parts of a human organ system (e.g., nervous, muscular, circulatory, digestive, reproductive) and organ systems work together to perform functions.

Core Extension 2: Use a model to show how two organ systems work together to perform a function. (CTAS-HS-LS1-2)

Teacher Notes:

Collect the following resources for this activity:

- Activity 2 Resource 1a: Skeletal System Poster
- Activity 2 Resource 1b: Muscular System Poster
- Activity 2 Resource 1c: Skeletal and Muscular Systems Working Together Poster
- Activity 2 Resource 2: Cards 2a – 2d
  - Card 2a – feel heat
  - Card 2b – smell flowers
  - Card 2c – think of ideas
  - Card 2d – raise a hand

Steps to Follow:

1. | **SAY** | "In this activity, we are going to talk about the skeletal system and the muscular system. We will explore how these two systems work together." |
2. Display Resource 1a: Skeletal System Poster for the student.
3. Indicate Resource 1a.

SAY	"This is a picture of the '**Skeletal System**'. This picture shows the bones inside a person's body *(indicate Skeletal System)*. Bones support the shape of the body."

4. Display Resource 1b: Muscular System Poster for the student.
5. Indicate Resource 1b.

SAY	"This is a picture of the '**Muscular System**'. This picture shows the muscles inside the body *(indicate Muscular System)*. Muscles extend and contract to help the body move."

6. Display Resource 1c: Skeletal and Muscular Systems Working Together Poster for the student.
7. Indicate Resource 1c.

SAY	"This picture shows the '**Skeletal and Muscular Systems Working Together**'."

8. | **ASK** | "When the skeletal and muscular systems work together, what can a person do?" |
9. Provide Resource 2: Cards 2a – 2d to the student. Indicate and read each Card.

a. Indicate Card 2a.

SAY	"feel heat"

b. Indicate Card 2b.

SAY	"smell flowers"

c. Indicate Card 2c.

SAY	"think of ideas"

d. Indicate Card 2d.

SAY	"raise a hand"

10.

ASK AGAIN	"When the skeletal and muscular systems work together, what can a person do?"

11. Allow student to respond and record response. If no response or if incorrect response, proceed to scaffolding instructions.

12. Indicate Card 2d.

SAY	"When the skeletal and muscular systems work together, a person can raise a hand."

13.

SAY	"We are now finished with this activity."

Scoring Guidance and Scaffolding

Scaffolding:

1. After student makes first incorrect attempt, remove the incorrect Card chosen by the student.

SAY	"[Insert description of incorrect Card chosen by the student] is not the correct answer."

2.

ASK	"When the skeletal and muscular systems work together, what can a person do?"

3. Provide Resource 2: Cards 2a – 2d to the student. Indicate and read each Card.

   a. Indicate Card 2a.

SAY	"feel heat"

   b. Indicate Card 2b.

SAY	"smell flowers"

   c. Indicate Card 2c.

SAY	"think of ideas"

   d. Indicate Card 2d.

SAY	"raise a hand"

4.

ASK AGAIN	"When the skeletal and muscular systems work together, what can a person do?"

5. Allow student to respond and record response.

6. Indicate Card 2d.

SAY	"When the skeletal and muscular systems work together, a person can raise a hand."

7.

SAY	"We are now finished with this activity."

The correct answer is as follows:

1. When the skeletal and muscular systems work together, what can a person do?
   a. Card 2d – raise a hand

Content Guidance	Rating	Score
Student… • gives NO response. **OR** • is unable to identify that the skeletal and muscular systems allow people to raise a hand when they work together (Card 2d).	The student **does not** demonstrate understanding.	0
Student… • **after scaffolding,** is able to identify that the skeletal and muscular systems allow people to raise a hand when they work together (Card 2d).	The student demonstrates limited understanding typically requiring additional support through scaffolding.	1
Student… • is able to identify that the skeletal and muscular systems allow people to raise a hand when they work together (Card 2d).	The student demonstrates understanding independently without scaffolding.	2

ACTIVITY 3

Essence Statement: CTAS-HS-LS1-2 Use a model to show how the parts of a human organ system (e.g., nervous, muscular, circulatory, digestive, reproductive) and organ systems work together to perform functions.

Core Extension 3: Identify the human body system or system component and the way that it supports the human body (e.g., identify the system or organ that supports breathing, lungs/respiratory system). (CTAS-HS-LS1-2)

Teacher Notes:

Collect the following resources for this activity:

- Activity 3 Resource 1: Respiratory System Poster
- Activity 3 Resource 2: Circulatory System Poster
- Activity 3 Resource 3: Strips 3a – 3c
  - Strip 3a – breathing of air
  - Strip 3b – blood throughout the body
  - Strip 3c – food to be digested

Steps to Follow:

1. | **SAY** | "In this activity, we are going to talk about the functions of different human body systems." |
2. Display Resource 1: Respiratory System Poster for the student.
3. Indicate Resource 1.

SAY	"This is a model of the '**Respiratory System**'. The respiratory system includes the nose *(indicate nose)*, mouth *(indicate mouth)*, larynx (*indicate larynx*), trachea *(indicate trachea)*, lungs *(indicate lungs)*, and diaphragm *(indicate diaphragm)*."

4. Display Resource 2: Circulatory System Poster for the student.
5. Indicate Resource 2.

SAY	"This is a model of the '**Circulatory System**'. The circulatory system includes the arteries *(indicate red artery)*, the heart *(indicate heart)*, and the veins *(indicate blue veins)*."

6. | **ASK** | "What is the main function of the respiratory system?" |
7. Provide Resource 3: Strips 3a – 3c to the student. Indicate and read each Strip.
   a. Indicate Strip 3a.

SAY	"support the breathing of air"

b. Indicate Strip 3b.

SAY	"move blood throughout the body"

c. Indicate Strip 3c.

SAY	"take in food to be digested"

8.

ASK AGAIN	"What is the main function of the respiratory system?"

9. Allow student to respond and record response. If no response or if incorrect response, proceed to scaffolding instructions.

10. Indicate Strip 3a.

SAY	"The main function of the respiratory system is to support the breathing of air."

11.

ASK	"What is the main function of the circulatory system?"

12. Provide Resource 3: Strips 3a – 3c to the student. Indicate and read each Strip.

a. Indicate Strip 3a.

SAY	"support the breathing of air"

b. Indicate Strip 3b.

SAY	"move blood throughout the body"

c. Indicate Strip 3c.

SAY	"take in food to be digested"

13.

ASK AGAIN	"What is the main function of the circulatory system?"

14. Allow student to respond and record response.

15. Indicate Strip 3b.

SAY	"The main function of the circulatory system is to move blood throughout the body."

16.

SAY	"We are now finished with this activity."

Scoring Guidance and Scaffolding

Scaffolding:

1. After student makes incorrect attempt, indicate Strip 3a.

SAY	"The main function of the respiratory system is to support the breathing of air."

2.

ASK	"What is the main function of the circulatory system?"

3. Provide Resource 3: Strips 3a – 3c to the student. Indicate and read each Strip.

   a. Indicate Strip 3a.

SAY	"support the breathing of air"

   b. Indicate Strip 3b.

SAY	"move blood throughout the body"

   c. Indicate Strip 3c.

SAY	"take in food to be digested"

4.

ASK AGAIN	"What is the main function of the circulatory system?"

5. Allow student to respond and record response.

6. Indicate Strip 3b.

SAY	"The main function of the circulatory system is to move blood throughout the body."

7.

SAY	"We are now finished with this activity."

Correct answers are as follows:

1. What is the main function of the respiratory system?
   a. Strip 3a – support the breathing of air
2. What is the main function of the circulatory system?
   a. Strip 3b – move blood throughout the body

Content Guidance	Rating	Score
Student… • gives NO response. **OR** • is unable to identify that the main function of the respiratory system is to support the breathing of air (Strip 3a); ***and*** • is unable to identify that the main function of the circulatory system is to move blood throughout the body (Strip 3b).	The student **does not** demonstrate understanding.	0
Student… • is able to identify that the main function of the respiratory system is to support the breathing of air (Strip 3a); ***and*** • is unable to identify that the main function of the circulatory system is to move blood throughout the body (Strip 3b). **OR** • is unable to identify that the main function of the respiratory system is to support the breathing of air (Strip 3a); ***and*** • **after scaffolding,** is able to identify that the main function of the circulatory system is to move blood throughout the body (Strip 3b).	The student demonstrates limited understanding typically requiring additional support through scaffolding.	1
Student… • is able to identify that the main function of the respiratory system is to support the breathing of air (Strip 3a); ***and*** • is able to identify to identify that the main function of the circulatory system is to move blood throughout the body (Strip 3b).	The student demonstrates understanding independently without scaffolding.	2

ACTIVITY 4

Essence Statement: CTAS-HS-LS1-4 Use a model to show how cell changes (e.g., maintenance through division, differentiation, or multiplication) result in changes to the organism (e.g., growth, complexity).

Core Extension 4: Use a model to relate the number of cells to the size of an organism. (CTAS-HS-LS1-4)

Teacher Notes:

Collect the following resources for this activity:

- Activity 4 Resource 1: Three Organisms Poster
- Activity 4 Resource 2: Cards 2a – 2c
  - Card 2a – dog
  - Card 2b – human
  - Card 2c – mouse

Steps to Follow:

1. | **SAY** | "In this activity, we are going to compare the number of cells in different living organisms. All living organisms are made of cells. Larger organisms have many more cells than smaller organisms." |
2. Display Resource 1: Three Organisms Poster for the student.
3. Indicate Resource 1.

   | **SAY** | "We are going to compare three organisms: a dog *(indicate dog)*, a human *(indicate human)*, and a mouse *(indicate mouse).*" |

4. | **ASK** | "Which organism is the largest?" |
5. Provide Resource 2: Cards 2a – 2c to the student. Indicate and read each Card.
   a. Indicate Card 2a.

      | **SAY** | "dog" |

   b. Indicate Card 2b.

      | **SAY** | "human" |

   c. Indicate Card 2c.

      | **SAY** | "mouse" |

6. | **ASK AGAIN** | "Which organism is the largest?" |
7. Allow student to respond and record response. If no response or if incorrect response, proceed to scaffolding instructions.

8. Indicate Card 2b.

SAY	"The human is the largest organism."

9.

ASK	"Which organism has the fewest number of cells?"

10. Provide remaining Resource 2: Card 2a and Card 2c to the student. Indicate and read each remaining Card.

a. Indicate Card 2a.

SAY	"dog"

b. Indicate Card 2c.

SAY	"mouse"

11.

ASK AGAIN	"Which organism has the fewest number of cells?"

12. Allow student to respond and record response.

13. Indicate Card 2c.

SAY	"The mouse has the fewest number of cells."

14.

SAY	"We are now finished with this activity."

Scoring Guidance and Scaffolding

Scaffolding:

1. After student makes first incorrect attempt, indicate Card 2b.

SAY	"The human is the largest organism."

2.

ASK	"Which organism has the fewest number of cells?"

3. Provide remaining Resource 2: Card 2a and Card 2c to the student. Indicate and read each remaining Card.

   a. Indicate Card 2a.

SAY	"dog"

   b. Indicate Card 2c.

SAY	"mouse"

4.

ASK AGAIN	"Which organism has the fewest number of cells?"

5. Allow student to respond and record response.

6. Indicate Card 2c.

SAY	"The mouse has the fewest number of cells."

7.

SAY	"We are now finished with this activity."

Correct answers are as follows:

1. Which organism is the largest?
   a. Card 2b – human
2. Which organism has the fewest number of cells?
   a. Card 2c – mouse

On average, humans have 37 trillion cells and mice have 1.2 trillion cells.

Content Guidance	Rating	Score
Student… • gives NO response. **OR** • is unable to determine that the human organism is the largest (Card 2b); ***and*** • is unable to determine that the mouse has the fewest number of cells (Card 2c).	The student **does not** demonstrate understanding.	0
Student… • is able to determine that the human organism is the largest (Card 2b); ***and*** • is unable to determine that the mouse has the fewest number of cells (Card 2c). **OR** • is unable to determine that the human organism is the largest (Card 2b); ***and*** • **after scaffolding,** is able to determine that the mouse has the fewest number of cells (Card 2c).	The student demonstrates limited understanding typically requiring additional support through scaffolding.	1
Student… • is able to determine that the human organism is the largest (Card 2b); ***and*** • is able to determine that the mouse has the fewest number of cells (Card 2c).	The student demonstrates understanding independently without scaffolding.	2

ACTIVITY 5

Essence Statement: CTAS-HS-LS1-4 Use a model to show how cell changes (e.g., maintenance through division, differentiation, or multiplication) results in changes to the organism (e.g., growth, complexity).

Core Extension 5: Use a model to show that as the complexity of an organism increases, so does the number, type, and specialization of cells. (CTAS-HS-LS1-4)

Teacher Notes:

Collect the following resources for this activity:

- Activity 5 Resource 1: Organisms Poster
- Activity 5 Resource 2: Cards 2a – 2c
  - Card 2a – Humans
  - Card 2b – Bacteria
  - Card 2c – Plants
- Activity 5 Resource 3: Sentence Strips 3a – 3c
  - Sentence Strip 3a – humans and plants more complex
  - Sentence Strip 3b – bacteria more complex
  - Sentence Strip 3c – plants as complex

Steps to Follow:

1. | **SAY** | "In this activity, we are going to explore the number of different cell types that organisms have. There are many different types of organisms. Some organisms have different types of cells." |
2. Display Resource 1: Organisms Poster for the student.
3. Indicate Resource 1.

SAY	"This picture shows three different organisms: humans, bacteria, and plants. Humans have many different types of cells to do many different types of jobs *(indicate Humans)* to help them survive. Bacteria have only one type of cell to do all of the jobs to survive *(indicate Bacteria)*. Plants have more types of cells than bacteria to do the jobs plants need to survive *(indicate Plants)*."

4. | **ASK** | "Which of these organisms are the most complex and have the most types of cells?" |
5. Provide Resource 2: Cards 2a – 2c to the student. Indicate and read each Card.
   a. Indicate Card 2a.

SAY	"Humans"

   b. Indicate Card 2b.

SAY	"Bacteria"

   c. Indicate Card 2c.

SAY	"Plants"

6. | **ASK AGAIN** | "Which of these organisms are the most complex and have the most types of cells?" |

7. Allow student to respond and record response. If no response or if incorrect response, proceed to scaffolding instructions.

8. Indicate Card 2a.

| **SAY** | "Compared to plants and bacteria, humans are the most complex organism." |

9. | **ASK** | "Which statement about the complexity of these organisms is true?" |

10. Provide Resource 3: Sentence Strips 3a – 3c to the student. Indicate and read each Sentence Strip.

a. Indicate Sentence Strip 3a.

| **SAY** | "Humans and plants are more complex than bacteria." |

b. Indicate Sentence Strip 3b.

| **SAY** | "The bacteria are more complex than humans and plants." |

c. Indicate Sentence Strip 3c.

| **SAY** | "Plants are as complex as bacteria." |

11. | **ASK AGAIN** | "Which statement about the complexity of these organisms is true?" |

12. Allow student to respond and record response.

13. Indicate Sentence Strip 3a.

| **SAY** | "Humans and plants are more complex than bacteria." |

14. | **SAY** | "We are now finished with this activity." |

Scoring Guidance and Scaffolding

Scaffolding:

1. After student makes first incorrect attempt, indicate Card 2a.

SAY	"Compared to plants and bacteria, humans are the most complex organism."

2.

ASK	"Which statement about the complexity of these organisms is true?"

3. Provide Resource 3: Sentence Strips 3a – 3c to the student. Indicate and read each Sentence Strip.

   a. Indicate Sentence Strip 3a.

SAY	"Humans and plants are more complex than bacteria."

   b. Indicate Sentence Strip 3b.

SAY	"The bacteria are more complex than humans and plants."

   c. Indicate Sentence Strip 3c.

SAY	"Plants are as complex as bacteria."

4.

ASK AGAIN	"Which statement about the complexity of these organisms is true?"

5. Allow student to respond and record response.

6. Indicate Sentence Strip 3a.

SAY	"Humans and plants are more complex than bacteria."

7.

SAY	"We are now finished with this activity."

Correct answers are as follows:

1. Which of these organisms are the most complex and have the most types of cells?
   a. Card 2a – Humans
2. Which statement about the complexity of these organisms is true?
   a. Sentence Strip 3a – Humans and plants are more complex than bacteria.

Content Guidance	Rating	Score
Student… • gives NO response. **OR** • is unable to compare organisms and identify that the most complex organisms are humans (Card 2a); ***and*** • is unable to identify that humans and plants are more complex than bacteria. (Sentence Strip 3a).	The student **does not** demonstrate understanding.	0
Student… • is able to compare organisms and identify that the most complex organisms are humans (Card 2a); ***and*** • is unable to identify that humans and plants are more complex than bacteria (Sentence Strip 3a). **OR** • is unable to compare organisms and identify that the most complex organisms are humans (Card 2a); ***and*** • **after scaffolding,** is able to identify that humans and plants are more complex than bacteria (Sentence Strip 3a).	The student demonstrates limited understanding typically requiring additional support through scaffolding.	1
Student… • is able to compare organisms and identify that the most complex organisms are humans (Card 2a); ***and*** • is able to identify that humans and plants are more complex than bacteria (Sentence Strip 3a).	The student demonstrates understanding independently without scaffolding.	2

ACTIVITY 6

Essence Statement: CTAS-HS-LS1-3 Use the results of an investigation as evidence that living systems respond to external change in order to maintain balance and survive.

Core Extension 6: Given an external change, identify the organism's response to the change increasing opportunities for survival (e.g., humans sweat to cool body when it is hot). (CTAS-HS-LS1-3)

Teacher Notes:

Collect the following resources for this activity:

- Activity 6 Resource 1: Cards 1a – 1d
  - Card 1a – winter
  - Card 1b – shiver
  - Card 1c – sweat
  - Card 1d – yawn

Steps to Follow:

1. | **SAY** | "In this activity, we are going to talk about how the human body responds to different temperatures." |
2. Display Resource 1: Card 1a to the student.
3. Indicate Card 1a.

   | **SAY** | "Scientists have observed that humans respond differently to changes in temperature. In the winter, the temperature outside can drop several degrees and it may start to snow." |

4. | **ASK** | "How does the human body respond in the winter when the temperature is very cold?" |
5. Provide Resource 1: Cards 1b – 1d to the student. Indicate and describe each Card.
   a. Indicate Card 1b.

   | **SAY** | "The human body begins to **shiver**." |

   b. Indicate Card 1c.

   | **SAY** | "The human body begins to **sweat**." |

   c. Indicate Card 1d.

   | **SAY** | "The human body begins to **yawn**." |

6. | **ASK AGAIN** | "How does the human body respond in the winter when the temperature is very cold?" |
7. Allow student to respond and record response. If no response or if incorrect response, proceed to scaffolding instructions.

8. Indicate Card 1b.

SAY	"The human body begins to **shiver** when the temperature is very cold."

9.

ASK	"How does the human body respond in the summer when the temperature is very hot?"

10. Provide remaining Resource 1: Card 1c and Card 1d to the student. Indicate and describe each remaining Card.

a. Indicate Card 1c.

SAY	"The human body begins to **sweat**."

b. Indicate Card 1d.

SAY	"The human body begins to **yawn**."

11.

ASK AGAIN	"How does the human body respond in the summer when the temperature is very hot?"

12. Allow student to respond and record response.

13. Indicate Card 1c.

SAY	"The human body begins to **sweat** in the summer when the temperature is very hot."

14.

SAY	"We are now finished with this activity."

Scoring Guidance and Scaffolding

Scaffolding:

1. After student makes first incorrect attempt, indicate Card 1b.

SAY	"The human body begins to **shiver** when the temperature is very cold."

2.

ASK	"How does the human body respond in the summer when the temperature is very hot?"

3. Provide remaining Resource 1: Card 1c and Card 1d to the student. Indicate and describe each remaining Card.

   a. Indicate Card 1c.

SAY	"The human body begins to **sweat**."

   b. Indicate Card 1d.

SAY	"The human body begins to **yawn**."

4.

ASK AGAIN	"How does the human body respond in the summer when the temperature is very hot?"

5. Allow student to respond and record response.

6. Indicate Card 1c.

SAY	"The human body begins to **sweat** in the summer when the temperature is very hot."

7.

SAY	"We are now finished with this activity."

Correct answers are as follows:

1. How does the human body respond in the winter when the temperature is very cold?
   a. Card 1b – shiver
2. How does the human body respond in the summer when the temperature is very hot?
   a. Card 1c – sweat

Content Guidance	Rating	Score
Student… • gives NO response. **OR** • is unable to identify the human body begins to shiver in the winter when the temperature is very cold (Card 1b); ***and*** • is unable to identify that the human body begins to sweat in the summer when the temperature is very hot (Card 1c).	The student **does not** demonstrate understanding.	0
Student… • is able to identify the human body begins to shiver in the winter when the temperature is very cold (Card 1b); ***and*** • is unable to identify that the human body begins to sweat in the summer when the temperature is very hot (Card 1c). **OR** • is unable to identify the human body begins to shiver in the winter when the temperature is very cold (Card 1b); ***and*** • **after scaffolding,** is able to identify that the human body begins to sweat in the summer when the temperature is very hot (Card 1c).	The student demonstrates limited understanding typically requiring additional support through scaffolding.	1
Student… • is able to identify the human body begins to shiver in the winter when the temperature is very cold (Card 1b); ***and*** • is able to identify that the human body begins to sweat in the summer when the temperature is very hot (Card 1c).	The student demonstrates understanding independently without scaffolding.	2

ACTIVITY 7

Essence Statement: CTAS-HS-LS1-3 Use the results of an investigation as evidence that living systems respond to external change in order to maintain balance and survive.

Core Extension 7: Provided the results of an investigation, make a claim about the body's ability to maintain balance of a vital feature (i.e., temperature, heart rate, breathing rate). (CTAS-HS-LS1-3)

Teacher Notes:

Collect the following resources for this activity:

- Activity 7 Resource 1: Student Running Poster
- Activity 7 Resource 2: Heart Rate and Breathing Rate Before and During the Run Data Table Poster
- Activity 7 Resource 3: Strips 3a – 3c
  - Strip 3a – digest food
  - Strip 3b – breathe air
  - Strip 3c – pump blood

Steps to Follow:

1. | **SAY** | "In this activity, we are going to talk about measurements that a student took before and during a run. The student measured her heart rate and her breathing rate before and during the run." |
2. Display Resource 1: Student Running Poster for the student.
3. Indicate Resource 1.

SAY	"This student is running around the track at her school."

4. Display Resource 2: Heart Rate and Breathing Rate Before and During the Run Data Table Poster for the student.
5. Indicate Resource 2.

SAY	"The student recorded her heart rate in this data table before and during her run. Before her run, the student's heart rate was 60 beats per minute *(indicate '**Heart Rate**' column before the run)*. This is called a resting heart rate. During her run, the student's heart rate increased to 120 beats per minute *(indicate '**Heart Rate**' column during the run)*. This is called an active heart rate."

6. | **ASK** | "Why does the student's heart rate increase during her run?" |
7. Provide Resource 3: Strips 3a – 3c to the student. Indicate and read each Strip.
   a. Indicate Strip 3a.

SAY	"to digest more food"

b. Indicate Strip 3b.

SAY	"to breathe more air"

c. Indicate Strip 3c.

SAY	"to pump more blood"

8.

ASK AGAIN	"Why does the student's heart rate increase during her run?"

9. Allow student to respond and record response. If no response or if incorrect response, proceed to scaffolding instructions.

10. Indicate Strip 3c.

SAY	"The student's heart rate increased during her run to pump more blood."

11. Indicate Resource 2.

SAY	"The student also recorded her breathing rate in this data table before and during her run. Before her run, the student's breathing rate was 15 breaths per minute *(indicate '**Breathing Rate**' column before the run)*. This is called a resting breathing rate. During her run, the student's breathing rate increased to 30 breaths per minute *(indicate '**Breathing Rate**' column during the run)*. This is called an active breathing rate."

12.

ASK	"Why does the student's breathing rate increase during her run?"

13. Provide remaining Resource 3: Strip 3a and Strip 3b to the student. Indicate and read each remaining Strip.

a. Indicate Strip 3a.

SAY	"to digest more food"

b. Indicate Strip 3b.

SAY	"to breathe more air"

14.

ASK AGAIN	"Why does the student's breathing rate increase during her run?"

15. Allow student to respond and record response.

16. Indicate Strip 3b.

SAY	"The student's breathing rate increased during her run to breathe more air."

17.

SAY	"We are now finished with this activity."

Scoring Guidance and Scaffolding

Scaffolding:

1. After student makes first incorrect attempt, indicate Strip 3c.

SAY	"The student's heart rate increased during her run to pump more blood."

2. Indicate Resource 2.

SAY	"The student also recorded her breathing rate in this data table before and during her run. Before her run, the student's breathing rate was 15 breaths per minute *(indicate '**Breathing Rate**' column before the run)*. This is called a resting breathing rate. During her run, the student's breathing rate increased to 30 breaths per minute *(indicate '**Breathing Rate**' column during the run)*. This is called an active breathing rate."

3.

ASK	"Why does the student's breathing rate increase during her run?"

4. Provide remaining Resource 3: Strip 3a and Strip 3b to the student. Indicate and read each remaining Strip.

a. Indicate Strip 3a.

SAY	"to digest more food"

b. Indicate Strip 3b.

SAY	"to breathe more air"

5.

ASK AGAIN	"Why does the student's breathing rate increase during her run?"

6. Allow student to respond and record response.

7. Indicate Strip 3b.

SAY	"The student's breathing rate increased during her run to breathe more air."

8.

SAY	"We are now finished with this activity."

Correct answers are as follows:

1. Why does the student's heart rate increase during her run?
    a. Strip 3c – to pump more blood
2. Why does the student's breathing rate increase during her run?
    a. Strip 3b – to breathe more air

Content Guidance	Rating	Score
Student… • gives NO response. **OR** • is unable to identify why the student's heart rate increases during her run (Strip 3c); ***and*** • is unable to identify why the student's breathing rate increases during her run (Strip 3b).	The student **does not** demonstrate understanding.	0
Student… • is able to identify why the student's heart rate increases during her run (Strip 3c); ***and*** • is unable to identify why the student's breathing rate increases during her run (Strip 3b). **OR** • is unable to identify why the student's heart rate increases during her run (Strip 3c); ***and*** • **after scaffolding,** is able to identify why the student's breathing rate increases during her run (Strip 3b).	The student demonstrates limited understanding typically requiring additional support through scaffolding.	1
Student… • is able to identify why the student's heart rate increases during her run (Strip 3c); ***and*** • is able to identify why the student's breathing rate increases during her run (Strip 3b).	The student demonstrates understanding independently without scaffolding.	2

Connecticut Alternate Science Assessment

Life Science

Storyline 4: Healthy Ecosystems

Grade 11 Performance Task

Life Science
Storyline 4: Healthy Ecosystems
Grade 11 Performance Task

Guiding Questions: What factors limit populations in an ecosystem? How can humans design solutions that contribute to a healthier environment? How does group behavior, adaptation, natural selection, and environmental conditions impact the organisms' ability to survive and reproduce?

NGSS Learning Progressions	Grade 11		
	NGSS Standard Performance Expectations	**Connecticut Alternate Science Essence Statements**	**Core Extensions**
LS2.A Interdependent Relationships in Ecosystems	HS-LS2-1 Use mathematical and/or computational representations to support explanations of factors that affect carrying capacity of ecosystems at different scales.	CTAS-HS-LS2-1 Use data to explain the factors that affect the limits on plant and animal populations in an ecosystem.	1. Identify two factors that affect the limits on plant or animal populations in an ecosystem. (CTAS-HS-LS2-1) 2. Recognize a group behavior (e.g., flocking, hunting in a pack) in animals. (CTAS-HS-LS2-8) 3. Describe two effects of a human activity on the environment. (CTAS-HS-LS2-7) 4. Use data from a table or graph to explain how a factor limits a plant or animal population in an ecosystem. (CTAS-HS-LS2-1) 5. Given a solution for reducing human impact on the environment, identify a positive and negative aspect. (CTAS-HS-LS2-7) 6. Given a scenario, use evidence to show how a group behavior helps plants or animals survive and reproduce. (CTAS-HS-LS2-8)
LS2.C Ecosystem Dynamics, Functioning, and Resilience	HS-LS2-7 Design, evaluate, and refine a solution for reducing the impacts of human activities on the environment and biodiversity.* HS-LS2-8 Evaluate the evidence for the role of group behavior on individual and species' chances to survive and reproduce.	CTAS-HS-LS2-7 Evaluate a possible solution for reducing the impact of human activities on the environment, including plants and animals.* CTAS-HS-LS2-8 Use evidence to show how group behaviors help animals survive and reproduce.	

NGSS Learning Progressions	Grade 11		
	NGSS Standard Performance Expectations	**Connecticut Alternate Science Essence Statements**	**Core Extensions**
LS4.C Adaptation	HS-LS4-4 Construct an explanation based on evidence for how natural selection leads to adaptation of populations. HS-LS4-5 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.	CTAS-HS-LS4-4/5 Use evidence to explain how natural selection leads to adaptation, growth, and/or possible extinction of populations of organisms and/or species.	7. Given several traits, identify one that varies and is passed on to offspring within a population of organisms. (CTAS-HS-LS4-5) 8. Given an environmental change, determine which physical adaptation would ensure the survival of a population. (CTAS-HS-LS4-4/5) 9. Given a scenario, use a graph or table to identify a cause and effect relationship between natural selection and an adaptation. (CTAS-HS-LS4-4/5)
Appropriate Vocabulary	Population, ecosystem, environment, limit, survival, trait, adaptation, positive, negative, alert, physical trait, shelter, predator, behavior, seed, beak, climate, offspring		

***Indicates a NGSS Standard Performance Expectation or Connecticut Alternate Science Essence Statement that incorporates engineering design.**

Life Science
Storyline 4: Healthy Ecosystems
Grade 11 Performance Task

General Overview:

This performance task will focus on plant and animal populations in an ecosystem. In this performance task, students will investigate what factors affect the size of different populations that live in an area, how animals work in groups, and how they adapt over time. Students will also consider human impacts on the plants and animals in our environment.

List of Materials Needed:

Teacher-Provided Resources:

There are no Teacher-Provided Resources that are required for this Performance Task.

Instructions for Preparing Materials:

Teachers must collect all relevant materials prior to the administration of each activity. The Card, Sentence Strip, and Strip Resources will need to be cut out. Resources are listed according to the Resource Identifier, which appears on the back of each Resource. The Resources needed for the administration of each activity are listed according to these Resource Identifiers in the Teacher Notes section of each activity.

List of Resources:

- Activity 1 Resource 1: Forest Ecosystem Poster
- Activity 1 Resource 2: Strips 2a – 2d
    - Strip 2a – food
    - Strip 2b – rocks
    - Strip 2c – wind
    - Strip 2d – water
- Activity 2 Resource 1: Strips 1a – 1c
    - Strip 1a – One Duck in Pond Poster
    - Strip 1b: Two Ducks in Pond Poster
    - Strip 1c: Ducks in V-Pattern Poster
- Activity 3 Resource 1: Healthy Forest Poster
- Activity 3 Resource 2: Unhealthy Forest Poster
- Activity 3 Resource 3: Sentence Strips 3a – 3d
    - Sentence Strip 3a – less food
    - Sentence Strip 3b – fewer trees
    - Sentence Strip 3c – less sunlight
    - Sentence Strip 3d – less rain water
- Activity 4 Resource 1: Birds and Trees in a Forest Data Table Poster
- Activity 4 Resource 2: Statement Poster

- Activity 4 Resource 3: Cards 3a – 3d
    - Card 3a – increased
    - Card 3b – increase
    - Card 3c – decreased
    - Card 3d – decrease
- Activity 4 Resource 4: Sentence Strips 4a – 4c
    - Sentence Strip 4a – less shelter
    - Sentence Strip 4b – more water
    - Sentence Strip 4c – less sunlight
- Activity 5 Resource 1: Sentence Strips 1a – 1d
    - Sentence Strip 1a – birds/nest
    - Sentence Strip 1b – deer/grass
    - Sentence Strip 1c – deer/predators
    - Sentence Strip 1d – birds/hide
- Activity 6 Resource 1: Deer Behavior Poster
- Activity 6 Resource 2: Sentence Strips 2a – 2d
    - Sentence Strip 2a – field
    - Sentence Strip 2b – coyote
    - Sentence Strip 2c – foot
    - Sentence Strip 2d – tail
- Activity 7 Resource 1: Squirrel Poster
- Activity 7 Resource 2: Sentence Strips 2a – 2c
    - Sentence Strip 2a – grey
    - Sentence Strip 2b – tail
    - Sentence Strip 2c – tree
- Activity 8 Resource 1: Mild Forest Ecosystem Climate Poster
- Activity 8 Resource 2: Arctic Forest Ecosystem Climate Poster
- Activity 8 Resource 3: Strips 3a – 3d
    - Strip 3a – long ears
    - Strip 3b – wide paws
    - Strip 3c – webbed feet
    - Strip 3d – thick fur
- Activity 9 Resource 1: Bird Beaks Over Time Data Table Poster
- Activity 9 Resource 2: Sentence Strips 2a – 2d
    - Sentence Strip 2a – large
    - Sentence Strip 2b – small
    - Sentence Strip 2c – broken shells
    - Sentence Strip 2d – not grow

ACTIVITY 1

Essence Statement: CTAS-HS-LS2-1 Use data to explain the factors that affect the limits on plant and animal populations in an ecosystem.

Core Extension 1: Identify two factors that affect the limits on plant or animal populations in an ecosystem. (CTAS-HS-LS2-1)

Teacher Notes:

Collect the following resources for this activity:

- Activity 1 Resource 1: Forest Ecosystem Poster
- Activity 1 Resource 2: Strips 2a – 2d
  - Strip 2a – food
  - Strip 2b – rocks
  - Strip 2c – wind
  - Strip 2d – water

Steps to Follow:

1. | **SAY** | "In this activity, we are going to talk about deer in a forest ecosystem." |
2. Display Resource 1: Forest Ecosystem Poster for the student.
3. Indicate Resource 1.

SAY	"This is a forest ecosystem. The forest has lots of trees, berry bushes, and green grass. The deer eat the grass and drink water from the stream. The wind blows through the forest."

4. | **ASK** | "What is one factor that affects the number of deer that can survive in the forest ecosystem?" |
5. Provide.
   a. Indicate Strip 2a.

SAY	"amount of food"

   b. Indicate Strip 2b.

SAY	"size of rocks"

   c. Indicate Strip 2c.

SAY	"direction of wind"

   d. Indicate Strip 2d.

SAY	"clean water"

6. | **ASK AGAIN** | "What is one factor that affects the number of deer that can survive in the forest ecosystem?" |

7. Allow student to respond and record response. If no response or if incorrect response, proceed to scaffolding instructions.

8. If the student chose a correct answer, reiterate the student's correct answer. Set chosen Strip aside.

9.

ASK	"What is another one factor that affects the number of deer that can survive in the forest ecosystem?"

10. Provide remaining Resource 2: Strips 2a – 2d to the student. Indicate and read each remaining Strip.

a. Indicate Strip 2a.

SAY	"amount of food"

b. Indicate Strip 2b.

SAY	"size of rocks"

c. Indicate Strip 2c.

SAY	"direction of wind"

d. Indicate Strip 2d.

SAY	"clean water"

11.

ASK AGAIN	"What is another one factor that affects the number of deer that can survive in the forest ecosystem?"

12. Allow student to respond and record response.

13. If the student chose a correct answer, reiterate the student's correct answer. Set chosen Strip aside.

14.

SAY	"We are now finished with this activity."

Scoring Guidance and Scaffolding

Scaffolding:

1. After student makes first incorrect attempt, indicate Strip 2d.

SAY	"Like people, deer need clean water to live. Clean water affects the size of the deer population in the forest ecosystem."

2.

ASK	"What is another one factor that affects the number of deer that can survive in the forest ecosystem?"

3. Provide remaining Resource 2: Strips 2a – 2c to the student. Indicate and read each remaining Strip.

   a. Indicate Strip 2a.

SAY	"amount of food"

   b. Indicate Strip 2b.

SAY	"size of rocks"

   c. Indicate Strip 2c.

SAY	"direction of wind"

4.

ASK AGAIN	"What is another one factor that affects the number of deer that can survive in the forest ecosystem?"

5. Allow student to respond and record response.

6. If the student chose a correct answer, reiterate the student's correct answer. Set chosen Strip aside.

7.

SAY	"We are now finished with this activity."

Correct answers are as follows:

1. What is one factor that affects the number of deer that can survive in the forest ecosystem?
   a. Strip 2a – amount of food
   OR
   b. Strip 2d – clean water
2. What is another factor that affects the number of deer that can survive in the forest ecosystem?
   a. Strip 2a – amount of food
   OR
   b. Strip 2d – clean water

Content Guidance	Rating	Score
Student… • gives NO response. **OR** • is unable to identify one factor that affects the size of the deer population in the forest ecosystem (Strip 2a); ***and*** • is unable to identify another factor that affects the size of the deer population in the forest ecosystem (Strip 2d).	The student **does not** demonstrate understanding.	0
Student… • is able to identify one factor that affects the size of the deer population in the forest ecosystem (Strip 2a); ***and*** • is unable to identify another factor that affects the size of the deer population in the forest ecosystem (Strip 2d). **OR** • is unable to identify one factor that affects the size of the deer population in the forest ecosystem (Strip 2d); ***and*** • **after scaffolding,** is able to identify another factor that affects the size of the deer population in the forest ecosystem (Strip 2a).	The student demonstrates limited understanding typically requiring additional support through scaffolding.	1
Student… • is able to identify one factor that affects the size of the deer population in the forest ecosystem (Strip 2a); ***and*** • is able to identify another factor that affects the size of the deer population in the forest ecosystem (Strip 2d).	The student demonstrates understanding independently without scaffolding.	2

ACTIVITY 2

Essence Statement: CTAS-HS-LS2-8 Use evidence to show how group behaviors help animals survive and reproduce.

Core Extension 2: Recognize a group behavior (e.g., flocking, hunting in a pack) in animals. (CTAS-HS-LS2-8)

Teacher Notes:

Collect the following resources for this activity:

- Activity 2 Resource 1: Strips 1a – 1c
  - Strip 1a – One Duck in Pond Poster
  - Strip 1b: Two Ducks in Pond Poster
  - Strip 1c: Ducks in V-Pattern Poster

Steps to Follow:

1. | **SAY** | "In this activity, we are going to talk about how ducks can participate in a group behavior to help the ducks to survive." |

2. | **ASK** | "Which picture shows a group behavior that helps the ducks survive?" |

3. Provide Resource 1: Strips 1a – 1c to the student. Indicate and describe each Strip.

   a. Indicate Strip 1a.

   | **SAY** | "This picture shows one duck sitting in a pond." |

   b. Indicate Strip 1b.

   | **SAY** | "This picture shows a duck sitting in a pond and another duck sitting on the grass beside the pond." |

   c. Indicate Strip 1c.

   | **SAY** | "This picture shows many ducks flying together in a V-pattern." |

4. | **ASK AGAIN** | "Which picture shows a group behavior that helps the ducks survive?" |

5. Allow student to respond and record response. If no response or if incorrect response, proceed to scaffolding instructions.

6. Indicate Strip 1c.

   | **SAY** | "Many ducks flying together in a V-pattern shows a group behavior that helps the ducks to survive." |

7. | **SAY** | "We are now finished with this activity." |

Scoring Guidance and Scaffolding

Scaffolding:

1. After student makes first incorrect attempt, remove the incorrect Strip chosen by the student.

SAY	"[Insert description of incorrect Strip chosen by the student] is not the correct answer."

2.

ASK	"Which picture shows a group behavior that helps the ducks survive?"

3. Provide remaining Strips 1a – 1c to the student. Indicate and describe each remaining Strip.

   a. Indicate Strip 1a.

SAY	"This picture shows one duck sitting in a pond."

   b. Indicate Strip 1b.

SAY	"This picture shows a duck sitting in a pond and another duck sitting on the grass beside the pond."

   c. Indicate Strip 1c.

SAY	"This picture shows many ducks flying together in a V-pattern."

4.

ASK AGAIN	"Which picture shows a group behavior that helps the ducks survive?"

5. Allow student to respond and record response.

6. Indicate Strip 1c.

SAY	"Many ducks flying together in a V-pattern shows a group behavior that helps the ducks to survive."

7.

SAY	"We are now finished with this activity."

The correct answer is as follows:

1. Which picture shows a group behavior that helps the ducks survive?
    a. Strip 1c – Many ducks flying together in a V-pattern shows a group behavior that helps the ducks to survive.

The survival benefit of ducks flying in a V-pattern is to save energy by getting free uplifts from the duck before it. "It can save energy by mooching off the air flow created by its flock-mate… Birds at the back of the V-pattern have slower heart rates than those in the front and flapped less often."

Reference

Yong, E. (2016, January 26). Birds That Fly in a V-Formation Use An Amazing Trick. Retrieved January 25, 2018, from http://phenomena.nationalgeographic.com/2014/01/15/birds-that-fly-in-a-v-formation-use-an-amazing-trick/

Content Guidance	Rating	Score
Student… • gives NO response. **OR** • is unable to identify the ducks participating in a group behavior for survival (Strip 1c).	The student **does not** demonstrate understanding.	0
Student… • **after scaffolding,** is able to identify the ducks participating in a group behavior for survival (Strip 1c).	The student demonstrates limited understanding typically requiring additional support through scaffolding.	1
Student… • is able to identify the ducks participating in a group behavior for survival (Strip 1c).	The student demonstrates understanding independently without scaffolding.	2

ACTIVITY 3

Essence Statement: CTAS-HS-LS2-7 Evaluate a possible solution for reducing the impact of human activities on the environment, including plants and animals.*

Core Extension 3: Describe two effects of a human activity on the environment. (CTAS-HS-LS2-7)

Teacher Notes:

Collect the following resources for this activity:

- Activity 3 Resource 1: Healthy Forest Poster
- Activity 3 Resource 2: Unhealthy Forest Poster
- Activity 3 Resource 3: Sentence Strips 3a – 3d
  - Sentence Strip 3a – less food
  - Sentence Strip 3b – fewer trees
  - Sentence Strip 3c – less sunlight
  - Sentence Strip 3d – less rain water

Steps to Follow:

1. | **SAY** | "In this activity, we are going to talk about deer that live in a forest." |
2. Display Resource 1: Healthy Forest Poster for the student.
3. Display Resource 2: Unhealthy Forest Poster for the student.
4. Indicate Resource 1.

SAY	"In the forest, there are several deer, many trees, the grass is green, and there are plenty of berry bushes."

5. Indicate Resource 2.

SAY	"People came to cut down the trees in the same forest. Now the forest does not have many trees, there is only one deer, the grass is brown and damaged, and there are fewer berry bushes."

6. | **ASK** | "What is one way that humans cutting down the trees in the forest affect the plants and animals in the forest?" |
7. Provide Resource 3: Sentence Strips 3a – 3d to the student. Indicate and read each Sentence Strip.
   a. Indicate Sentence Strip 3a.

SAY	"There is less food for the deer to eat."

   b. Indicate Sentence Strip 3b.

SAY	"There are fewer trees for shelter."

   c. Indicate Sentence Strip 3c.

SAY	"There is less sunlight reaching the forest floor."

d. Indicate Sentence Strip 3d.

SAY	"There is less rain water for animals to drink."

8.

ASK AGAIN	"What is one way that humans cutting down the trees in the forest affect the plants and animals in the forest?"

9. Allow student to respond and record response. If no response or if incorrect response, proceed to scaffolding instructions.

10. If the student chose a correct answer, reiterate the student's correct answer. Set chosen Sentence Strip aside.

11.

ASK	"What is another way that humans cutting down the trees in the forest affect the plants and animals in the forest?"

12. Provide remaining Resource 3: Sentence Strips 3a – 3d to the student. Indicate and read each remaining Sentence Strip.

a. Indicate Sentence Strip 3a.

SAY	"There is less food for the deer to eat."

b. Indicate Sentence Strip 3b.

SAY	"There are fewer trees for shelter."

c. Indicate Sentence Strip 3c.

SAY	"There is less sunlight reaching the forest floor."

d. Indicate Sentence Strip 3d.

SAY	"There is less rain water for animals to drink."

13.

ASK AGAIN	"What is another way that humans cutting down the trees in the forest affect the plants and animals in the forest?"

14. Allow student to respond and record response.

15. If the student chose a correct answer, reiterate the student's correct answer. Set chosen Sentence Strip aside.

16.

SAY	"We are now finished with this activity."

Scoring Guidance and Scaffolding

Scaffolding:

1. After student makes first incorrect attempt, indicate Sentence Strip 3a.

SAY	"If people cut down trees in a forest, there is less food for the deer to eat."

2.

ASK	"What is another way that humans cutting down the trees in the forest affect the plants and animals in the forest?"

3. Provide remaining Resource 3: Sentence Strips 3b – 3d to the student. Indicate and read each remaining Sentence Strip.

   a. Indicate Sentence Strip 3b.

SAY	"There are fewer trees for shelter."

   b. Indicate Sentence Strip 3c.

SAY	"There is less sunlight reaching the forest floor."

   c. Indicate Sentence Strip 3d.

SAY	"There is less rain water for animals to drink."

4.

ASK AGAIN	"What is another way that humans cutting down the trees in the forest affect the plants and animals in the forest?"

5. Allow student to respond and record response.

6. Indicate Sentence Strip 3a.

SAY	"If people cut down trees in a forest, there are fewer trees for shelter."

7.

SAY	"We are now finished with this activity."

Correct answers are as follows:

1. What is one way that humans cutting down the trees in the forest affect the plants and animals in the forest?
   a. Sentence Strip 3a – There is less food for the deer to eat.
   OR
   b. Sentence Strip 3b – There are fewer trees for shelter.
2. What is another way that humans cutting down the trees in the forest affect the plants and animals in the forest?
   a. Sentence Strip 3a – There is less food for the deer to eat.
   OR
   b. Sentence Strip 3b – There are fewer trees for shelter.

Content Guidance	Rating	Score
Student… • gives NO response. **OR** • is unable to identify one way that humans cutting down the trees affect the plants and animals in the forest (Sentence Strip 3a or Sentence Strip 3b); ***and*** • is unable to identify another way that humans cutting down the trees affect the plants and animals in the forest (Sentence Strip 3a or Sentence Strip 3b).	The student **does not** demonstrate understanding.	0
Student… • is able to identify one way that humans cutting down the trees affect the plants and animals in the forest (Sentence Strip 3a or Sentence Strip 3b); ***and*** • is unable to identify another way that humans cutting down the trees affect the plants and animals in the forest (Sentence Strip 3a or Sentence Strip 3b). **OR** • is unable to identify one way that humans cutting down the trees affect the plants and animals in the forest (Sentence Strip 3a or Sentence Strip 3b); ***and*** • **after scaffolding,** is able to identify another way that humans cutting down the trees affect the plants and animals in the forest (Sentence Strip 3b).	The student demonstrates limited understanding typically requiring additional support through scaffolding.	1
Student… • is able to identify one way that humans cutting down the trees affect the plants and animals in the forest (Sentence Strip 3a or Sentence Strip 3b); ***and*** • is able to identify another way that humans cutting down the trees affect the plants and animals in the forest (Sentence Strip 3a or Sentence Strip 3b).	The student demonstrates understanding independently without scaffolding.	2

ACTIVITY 4

Essence Statement: CTAS-HS-LS2-1 Use data to explain the factors that affect the limits on plant and animal populations in an ecosystem.

Core Extension 4: Use data from a table or graph to explain how a factor limits a plant or animal population in an ecosystem. (CTAS-HS-LS2-1)

Teacher Notes:

Collect the following resources for this activity:

- Activity 4 Resource 1: Birds and Trees in a Forest Data Table Poster
- Activity 4 Resource 2: Statement Poster
- Activity 4 Resource 3: Cards 3a – 3d
  - Card 3a – increased
  - Card 3b – increase
  - Card 3c – decreased
  - Card 3d – decrease
- Activity 4 Resource 4: Sentence Strips 4a – 4c
  - Sentence Strip 4a – less shelter
  - Sentence Strip 4b – more water
  - Sentence Strip 4c – less sunlight

Steps to Follow:

1. | **SAY** | "In this activity, we are going to talk about the number of trees and the number of birds in a forest" |
2. Display Resource 1: Birds and Trees in a Forest Data Table Poster for the student.
3. Indicate Resource 1.

   | **SAY** | "Scientists study the number of trees and the number of birds in a part of a forest for two years. This data table shows the data that the scientists collected." |
4. Display Resource 2: Statement Poster for the student.
5. Indicate Resource 2.

   | **SAY** | "This is a statement about the data in the table. From Year 1 to Year 2, the number of trees **'blank'**. This caused the number of birds to **'blank'**." |
6. Indicate Resource 1.

   | **SAY** | "Using the data in the table, let's fill in the blanks in the statement using our 'increase' and 'decrease' Cards." |
8. Provide Resource 3: Cards 3a – 3d to the student. Indicate and read each Card.

   a. Indicate Card 3a.

   | **SAY** | "increased" |

b. Indicate Card 3b.

SAY	"increase"

c. Indicate Card 3c.

SAY	"decreased"

d. Indicate Card 3d.

SAY	"decrease"

9. Indicate Resource 1.

SAY	"Using the data in the table, let's fill in the blanks in the statement using our 'increase' and 'decrease' Cards. The statement is, 'From Year 1 to Year 2, the number of trees **'blank'**. This caused the number of birds to **'blank'**."

10. Allow student to respond and record response. If no response or if incorrect response, proceed to scaffolding instructions.

11. Indicate Resource 1 and read the completed statement to the student.

SAY	"From Year 1 to Year 2, the number of trees **decreased** *(indicate Card 3c)*. This caused the number of birds to **decrease** *(indicate Card 3d)*."

12.

ASK	"What impact does the number of trees in the forest have on the number of birds in the forest?"

13. Provide Resource 4: Sentence Strips 4a – 4c to the student. Indicate and read each Sentence Strip.

a. Indicate Sentence Strip 4a.

SAY	"There is less shelter."

b. Indicate Sentence Strip 4b.

SAY	"There is more water."

c. Indicate Sentence Strip 4c.

SAY	"There is less sunlight."

14.

ASK AGAIN	"What impact does the number of trees in the forest have on the number of birds in the forest?"

15. Allow student to respond and record response.

16. Indicate Sentence Strip 4a.

SAY	"There is less shelter."

17.

SAY	"We are now finished with this activity."

Scoring Guidance and Scaffolding

Scaffolding:

1. After student makes first incorrect attempt, indicate Resource 1 and read the completed statement to the student.

SAY	"From Year 1 to Year 2, the number of trees **<u>decreased</u>** *(indicate Card 3c)*. This caused the number of birds to **<u>decrease</u>** *(indicate Card 3d)*."

2.

ASK	"What impact does the number of trees in the forest have on the number of birds in the forest?"

3. Provide Resource 4: Sentence Strips 4a – 4c to the student. Indicate and read each Sentence Strip.

   a. Indicate Sentence Strip 4a.

SAY	"There is less shelter."

   b. Indicate Sentence Strip 4b.

SAY	"There is more water."

   c. Indicate Sentence Strip 4c.

SAY	"There is less sunlight."

4.

ASK AGAIN	"What impact does the number of trees in the forest have on the number of birds in the forest?"

5.

Allow student to respond and record response.

6. Indicate Sentence Strip 4a.

SAY	"There is less shelter."

7.

SAY	"We are now finished with this activity."

Correct answers are as follows:

1. Using the data in the table, let's fill in the blanks in the statement using our 'increase' and 'decrease' Cards.
    a. The statement should be filled with Card 3c and Card 3d out as follows: From Year 1 to Year 2, the number of trees **decreased**. This caused the number of birds to **decrease**.
2. What impact does the number of trees in the forest have on the number of birds in the forest?
    a. Sentence Strip 4a – There is less shelter.

Content Guidance	Rating	Score
Student… • gives NO response. **OR** • is unable to correctly complete the first statement by filling in each blank with a decrease(d) card (Card 3c and Card 3d); ***and*** • is unable to identify that the number of trees in the forest impacts the number of birds in the forest because there is less shelter (Sentence Strip 4a).	The student **does not** demonstrate understanding.	0
Student… • is able to correctly complete the first statement by filling in each blank with a decrease(d) card (Card 3c and Card 3d); ***and*** • is unable to identify that the number of trees in the forest impacts the number of birds in the forest because there is less shelter (Sentence Strip 4a). **OR** • is unable to correctly complete the first statement by filling in each blank with a decrease(d) card (Card 3c and Card 3d); ***and*** • **after scaffolding,** is able to identify that the number of trees in the forest impacts the number of birds in the forest because there is less shelter (Sentence Strip 4a).	The student demonstrates limited understanding typically requiring additional support through scaffolding.	1
Student… • is able to correctly complete the first statement by filling in each blank with a decrease(d) card (Card 3c and Card 3d); ***and*** • is able to identify that the number of trees in the forest impacts the number of birds in the forest because there is less shelter (Sentence Strip 4a).	The student demonstrates understanding independently without scaffolding.	2

ACTIVITY 5

Essence Statement: CTAS-HS-LS2-7 Evaluate a possible solution for reducing the impact of human activities on the environment, including plants and animals.*

Core Extension 5: Given a solution for reducing human impact on the environment, identify a positive and negative aspect. (CTAS-HS-LS2-7)

Teacher Notes:

Collect the following resources for this activity:

- Activity 5 Resource 1: Sentence Strips 1a – 1d
  - Sentence Strip 1a – birds/nest
  - Sentence Strip 1b – deer/grass
  - Sentence Strip 1c – deer/predators
  - Sentence Strip 1d – birds/hide

Steps to Follow:

1. | **SAY** | "In this activity, we are going to talk about a forest. People have decided to plant new trees in the forest. The new trees have wider branches that do not allow the sunlight to reach the forest floor. The forest floor is shaded." |

2. | **ASK** | "What would be a **positive** impact on the forest environment if people decide to plant new trees in the forest?" |

3. Provide Sentence Strips 1a – 1d to the student. Indicate and read each Sentence Strip.

   a. Indicate Sentence Strip 1a.

   | **SAY** | "Birds will have more places to build a nest." |

   b. Indicate Sentence Strip 1b.

   | **SAY** | "Deer will have less grass to eat." |

   c. Indicate Sentence Strip 1c.

   | **SAY** | "Deer will have more predators." |

   d. Indicate Sentence Strip 1d.

   | **SAY** | "Birds will have less places to hide." |

4. | **ASK AGAIN** | "What would be a **positive** impact on the forest environment if people decide to plant new trees in the forest?" |

5. Allow student to respond and record response. If no response or if incorrect response, proceed to scaffolding instructions.

6. Indicate Sentence Strip 1a.

SAY	"Birds will have more places to build a nest because there will be more trees in the forest."

7.

ASK	"What would be a **negative** impact on the forest environment if people decide to plant new trees in the forest?"

8. Provide remaining Sentence Strips 1b – 1d to the student. Indicate and read each remaining Sentence Strip.

a. Indicate Sentence Strip 1b.

SAY	"Deer will have less grass to eat."

b. Indicate Sentence Strip 1c.

SAY	"Deer will have more predators."

c. Indicate Sentence Strip 1d.

SAY	"Birds will have less places to hide."

9.

ASK AGAIN	"What would be a **negative** impact on the forest environment if people decide to plant new trees in the forest?"

10. Allow student to respond and record response.

11. Indicate Sentence Strip 1b.

SAY	"Deer will have less grass to eat because the grass does not grow well on the forest floor without sunlight."

12.

SAY	"We are now finished with this activity."

Scoring Guidance and Scaffolding

Scaffolding:

1. After student makes first incorrect attempt, indicate Sentence Strip 1a.

SAY	"Birds will have more places to build a nest because there will be more trees in the forest. This a **positive** impact on the forest environment."

2.

ASK	"What would be a **negative** impact on the forest environment if people decide to plant new trees in the forest?"

3. Provide remaining Sentence Strips 1b – 1d to the student. Indicate and read each remaining Sentence Strip.

a. Indicate Sentence Strip 1b.

SAY	"Deer will have less grass to eat."

b. Indicate Sentence Strip 1c.

SAY	"Deer will have more predators."

c. Indicate Sentence Strip 1d.

SAY	"Birds will have less places to hide."

4.

ASK AGAIN	"What would be a **negative** impact on the forest environment if people decide to plant new trees in the forest?"

5. Allow student to respond and record response.

6. Indicate Sentence Strip 1b.

SAY	"Deer will have less grass to eat because the grass does not grow well on the forest floor without sunlight."

7.

SAY	"We are now finished with this activity."

Correct answers are as follows:

1. What would be a **positive** impact on the forest environment if people decide to plant new trees in the forest?
    a. Sentence Strip 1a – Birds will have more places to build a nest.
2. What would be a **negative** impact on the forest environment if people decide to plant new trees in the forest?
    a. Sentence Strip 1b – Deer will have less grass to eat.

Content Guidance	Rating	Score
Student… • gives NO response. **OR** • is unable to identify a positive impact on the forest environment (Sentence Strip 1a); ***and*** • is unable to identify a negative impact on the forest environment (Sentence Strip 1b).	The student **does not** demonstrate understanding.	0
Student… • is able to identify a positive impact on the forest environment (Sentence Strip 1a); ***and*** • is unable to identify a negative impact on the forest environment (Sentence Strip 1b). **OR** • is unable to identify a positive impact on the forest environment (Sentence Strip); ***and*** • **after scaffolding,** is able to identify a negative impact on the forest environment (Sentence Strip 1b).	The student demonstrates limited understanding typically requiring additional support through scaffolding.	1
Student… • is able to identify one positive impact on the forest environment (Sentence Strip 1a); ***and*** • is able to identify a negative impact on the forest environment (Sentence Strip 1b).	The student demonstrates understanding independently without scaffolding.	2

ACTIVITY 6

Essence Statement: CTAS-HS-LS2-8 Use evidence to show how group behaviors help animals survive and reproduce.

Core Extension 6: Given a scenario, use evidence to show how a group behavior helps plants or animals survive and reproduce. (CTAS-HS-LS2-8)

Teacher Notes:

Collect the following resources for this activity:

- Activity 6 Resource 1: Deer Behavior Poster
- Activity 6 Resource 2: Sentence Strips 2a – 2d
  - Sentence Strip 2a – field
  - Sentence Strip 2b – coyote
  - Sentence Strip 2c – foot
  - Sentence Strip 2d – tail

Steps to Follow:

1. | **SAY** | "In this activity, we are going to talk about how a group behavior of deer helps them to survive." |
2. Display Resource 1: Deer Behavior Poster for the student.
3. Indicate Resource 1.

SAY	"Many deer eat food in a field. One deer sees the coyote. A deer raises its tail. The deer stomps its foot, and it makes a noise."

4. | **ASK** | "What is one behavior that alerts the group of deer to help them to survive?" |
5. Provide Resource 2: Sentence Strips 2a – 2d to the student. Indicate and read each Sentence Strip.

a. Indicate Sentence Strip 2a.

SAY	"The deer is in a field."

b. Indicate Sentence Strip 2b.

SAY	"The deer sees a coyote."

c. Indicate Sentence Strip 2c.

SAY	"The deer stomps its foot."

d. Indicate Sentence Strip 2d.

SAY	"The deer raises its tail."

6. | **ASK AGAIN** | "What is one behavior that alerts the group of deer to help them to survive?" |

7. Allow student to respond and record response. If no response or if incorrect response, proceed to scaffolding instructions.

8. If the student chose the correct answer, reiterate the student's correct answer. Set chosen Sentence Strip aside.

9.

ASK	"What is another behavior that alerts the group of deer to help them to survive?"

10. Provide remaining Resource 2: Sentence Strips 2a – 2d to the student. Indicate and read each remaining Sentence Strip.

a. Indicate Sentence Strip 2a.

SAY	"The deer is in a field."

b. Indicate Sentence Strip 2b.

SAY	"The deer sees a coyote."

c. Indicate Sentence Strip 2c.

SAY	"The deer stomps its foot."

d. Indicate Sentence Strip 2d.

SAY	"The deer raises its tail."

11.

ASK AGAIN	"What is another behavior that alerts the group of deer to help them to survive?"

12. Allow student to respond and record response.

13. If the student chose the correct answer, reiterate the student's correct answer. Set chosen Sentence Strip aside.

14.

SAY	"We are now finished with this activity."

Scoring Guidance and Scaffolding

Scaffolding:

1. Indicate Sentence Strip 2c.

SAY	"The deer stomps it foot to warn the other deer that a coyote is nearby."

2.

ASK	"What is another behavior that alerts the group of deer to help them to survive?"

3. Provide remaining Resource 2: Sentence Strips 2a – 2d to the student. Indicate and read each remaining Sentence Strip.

a. Indicate Sentence Strip 2a.

SAY	"The deer is in a field."

b. Indicate Sentence Strip 2b.

SAY	"The deer sees a coyote."

c. Indicate Sentence Strip 2c.

SAY	"The deer stomps its foot."

d. Indicate Sentence Strip 2d.

SAY	"The deer raises its tail."

4.

ASK AGAIN	"What is another behavior that alerts the group of deer to help them to survive?"

5. Allow student to respond and record response.

6. If the student chose the correct answer, reiterate the student's correct answer. Set chosen Sentence Strip aside.

7.

SAY	"We are now finished with this activity."

Correct answers are as follows:

1. What is one behavior that alerts the group of deer to help them to survive?
   a. Sentence Strip 2c – The deer stomps its foot.
   OR
   b. Sentence Strip 2d – The deer raises its tail.
2. What is another behavior that alerts the group of deer to help them to survive?
   a. Sentence Strip 2c – The deer stomps its foot.
   OR
   b. Sentence Strip 2d – The deer raises its tail.

Seeing the coyote is not a way to alert the group of deer. Therefore, Sentence Strip 2b is not a correct option.

Content Guidance	Rating	Score
Student… • gives NO response. **OR** • is unable to identify one behavior that alerts the group of deer to help them to survive (Sentence Strip 2c or Sentence Strip 2d); ***and*** • is unable to identify another behavior that alerts the group of deer to help them to survive (Sentence Strip 2c or Sentence Strip 2d).	The student **does not** demonstrate understanding.	0
Student… • is able to identify one behavior that alerts the group of deer to help them to survive (Sentence Strip 2c or Sentence Strip 2d); ***and*** • is unable to identify another behavior that alerts the group of deer to help them to survive (Sentence Strip 2c or Sentence Strip 2d). **OR** • is unable to identify one behavior that alerts the group of deer to help them to survive (Sentence Strip 2c or Sentence Strip 2d); ***and*** • **after scaffolding,** is able to identify another behavior that alerts the group of deer to help them to survive (Sentence Strip 2d).	The student demonstrates limited understanding typically requiring additional support through scaffolding.	1
Student… • is able to identify one behavior that alerts the group of deer to help them to survive (Sentence Strip 2c or Sentence Strip 2d); ***and*** • is able to identify another behavior that helps the group of deer to survive (Sentence Strip 2c or Sentence Strip 2d).	The student demonstrates understanding independently without scaffolding.	2

ACTIVITY 7

Essence Statement: CTAS-HS-LS4-4/5 Use evidence to explain how natural selection leads to adaptation, growth, and/or possible extinction of populations of organisms and/or species.

Core Extension 7: Given several traits, identify one that varies and is passed on to offspring within a population of organisms. (CTAS-HS-LS4-5)

Teacher Notes:

Collect the following resources for this activity:

- Activity 7 Resource 1: Squirrel Poster
- Activity 7 Resource 2: Sentence Strips 2a – 2c
  - Sentence Strip 2a – grey
  - Sentence Strip 2b – tail
  - Sentence Strip 2c – tree

Steps to Follow:

1. | **SAY** | "In this activity, we are going to talk about traits that describe a squirrel." |
2. Display Resource 1: Squirrel Poster for the student.
3. Indicate Resource 1.

SAY	"This is a picture of a squirrel. There are a few traits that describe this squirrel: the squirrel has grey fur; the squirrel has an injured tail; and the squirrel lives in a tree."

4. | **ASK** | "Which is a physical trait that the squirrel can pass on to its offspring?" |
5. Provide Resource 2: Sentence Strips 2a – 2c to the student. Indicate and read each Sentence Strip.

a. Indicate Sentence Strip 2a.

SAY	"This squirrel has grey fur."

b. Indicate Sentence Strip 2b.

SAY	"This squirrel has an injured tail."

c. Indicate Sentence Strip 2c.

SAY	"This squirrel lives in a tree."

6. | **ASK AGAIN** | "Which is a physical trait that the squirrel can pass on to its offspring?" |
7. Allow student to respond and record response. If no response or if incorrect response, proceed to scaffolding instructions.

8. Indicate Sentence Strip 2a.

SAY	"Grey fur is a physical trait that the squirrel can pass on to its offspring."

9.

SAY	"We are now finished with this activity."

Scoring Guidance and Scaffolding

Scaffolding:

1. After student makes first incorrect attempt, remove the incorrect Sentence Strip chosen by the student.

SAY	"[Insert description of incorrect Sentence Strip chosen by the student] is not the correct answer."

2.

ASK	"Which is a physical trait that the squirrel can pass on to its offspring?"

3. Provide Resource 2: Sentence Strips 2a – 2c to the student. Indicate and read each Sentence Strip.

a. Indicate Sentence Strip 2a.

SAY	"This squirrel has grey fur."

b. Indicate Sentence Strip 2b.

SAY	"This squirrel has an injured tail."

c. Indicate Sentence Strip 2c.

SAY	"This squirrel lives in a tree."

4.

ASK AGAIN	"Which is a physical trait that the squirrel can pass on to its offspring?"

5. Allow student to respond and record response.

6. Indicate Sentence Strip 2a.

SAY	"Grey fur is a physical trait that the squirrel can pass on to its offspring."

7.

SAY	"We are now finished with this activity."

The correct answer is as follows:

1. Which is a physical trait that the squirrel can pass on to its offspring?
    a. Sentence Strip 2a – This squirrel has grey fur.

Content Guidance	Rating	Score
Student… • gives NO response. **OR** • is unable to identify the physical trait that this squirrel can pass on to its offspring (Sentence Strip 2a).	The student **does not** demonstrate understanding.	0
Student… • **after scaffolding,** is able to identify the physical trait that this squirrel can pass on to its offspring (Sentence Strip 2a).	The student demonstrates limited understanding typically requiring additional support through scaffolding.	1
Student… • is able to identify the physical trait that this squirrel can pass on to its offspring (Sentence Strip 2a).	The student demonstrates understanding independently without scaffolding.	2

ACTIVITY 8

Essence Statement: CTAS-HS-LS4-4/5 Use evidence to explain how natural selection leads to adaptation, growth, and/or possible extinction of populations of organisms and/or species.

Core Extension 8: Given an environmental change, determine which physical adaptation would ensure the survival of a population. (CTAS-HS-LS4-4/5)

Teacher Notes:

Collect the following resources for this activity:

- Activity 8 Resource 1: Mild Forest Ecosystem Climate Poster
- Activity 8 Resource 2: Arctic Forest Ecosystem Climate Poster
- Activity 8 Resource 3: Strips 3a – 3d
  - Strip 3a – long ears
  - Strip 3b – wide paws
  - Strip 3c – webbed feet
  - Strip 3d – thick fur

Steps to Follow:

1. | **SAY** | "In this activity, we are going to talk about animal adaptations. Animals have adaptations to live in certain ecosystems. Adaptations are traits in an animal that change so that they can survive in an ecosystem." |
2. Display Resource 1: Mild Forest Ecosystem Climate Poster.
3. Indicate Resource 1.

SAY	"Long ago, an area was a mild forest ecosystem. This forest had tall redwood trees and ferns. This forest also had warmer temperatures and lots of rain."

4. Display Resource 2: Arctic Forest Ecosystem Climate Poster.
5. Indicate Resource 2.

SAY	"Over time, the climate changed in this forest ecosystem. This forest became very cold with much of the area covered with ice and snow. The animals that live in this forest have certain adaptations so they can survive the cold."

6. | **ASK** | "What is one animal adaptation that would help animals survive in this very cold climate in this forest ecosystem?" |
7. Provide Resource 3: Strips 3a – 3d to the student. Indicate and read each Strip.

a. Indicate Strip 3a.

SAY	"long ears to give off heat"

b. Indicate Strip 3b.

SAY	"wide paws to walk on snow"

c. Indicate Strip 3c.

SAY	"webbed feet to swim"

d. Indicate Strip 3d.

SAY	"thick fur to stay warm"

8.

ASK AGAIN	"What is one animal adaptation that would help animals survive in this very cold climate in this forest ecosystem?"

9. Allow student to respond and record response. If no response or if incorrect response, proceed to scaffolding instructions.

10. If the student chose the correct answer, reiterate the student's correct answer. Set chosen Strip aside.

11.

ASK	"What is another animal adaptation that would help animals survive in this very cold climate in this forest ecosystem?"

12. Provide remaining Resource 3: Strips 3a – 3d to the student. Indicate and read each remaining Strip.

a. Indicate Strip 3a.

SAY	"long ears to give off heat"

b. Indicate Strip 3b.

SAY	"wide paws to walk on snow"

c. Indicate Strip 3c.

SAY	"webbed feet to swim"

d. Indicate Strip 3d.

SAY	"thick fur to stay warm"

13.

ASK AGAIN	"What is another animal adaptation that would help animals survive in this very cold climate in this forest ecosystem?"

14. Allow student to respond and record response.

15. If the student chose the correct answer, reiterate the student's correct answer. Set chosen Strip aside.

16.

SAY	"We are now finished with this activity."

Scoring Guidance and Scaffolding

Scaffolding:

1. After student makes first incorrect attempt, indicate Strip 3b.

SAY	"Some animals have wide paws to walk on snow."

2.

ASK	"What is another animal adaptation that would help animals survive in this very cold climate in this forest ecosystem?"

3. Provide remaining Resource 3: Strips 3a – 3d to the student. Indicate and read each remaining Strip.

a. Indicate Strip 3a.

SAY	"long ears to give off heat"

b. Indicate Strip 3c.

SAY	"webbed feet to swim"

c. Indicate Strip 3d.

SAY	"thick fur to stay warm"

4.

ASK AGAIN	"What is another animal adaptation that would help animals survive in this very cold climate in this forest ecosystem?"

5. Allow student to respond and record response.

6. If the student chose the correct answer, reiterate the student's correct answer. Set chosen Strip aside.

7.

SAY	"We are now finished with this activity."

Correct answers are as follows:

1. What is one animal adaptation that would help animals survive in this very cold climate in the forest ecosystem?
   a. Strip 3b – wide paws to walk on snow
   OR
   b. Strip 3d – thick fur to stay warm
2. What is another animal adaptation that would help animals survive in this very cold climate in the forest ecosystem?
   a. Strip 3b – wide paws to walk on snow
   OR
   b. Strip 3d – thick fur to stay warm

Content Guidance	Rating	Score
Student… • gives NO response. **OR** • is unable to determine one animal adaptation that will help the animals to survive in a very cold climate in the forest ecosystem (Strip 3b or Strip 3d); ***and*** • is unable to determine another animal adaptation that will help the animals to survive in a very cold climate in the forest ecosystem (Strip 3b or Strip 3d).	The student **does not** demonstrate understanding.	0
Student… • is able to determine one animal adaptation that will help the animals to survive in a very cold climate in the forest ecosystem (Strip 3b or Strip 3d); ***and*** • is unable to determine another animal adaptation that will help the animals to survive in a very cold climate in the forest ecosystem (Strip 3b **or** Strip 3d). **OR** • is unable to determine one animal adaptation that will help the animals to survive in a very cold climate in the forest ecosystem (Strip 3b); ***and*** • **after scaffolding,** is able to determine another animal adaptation that will help the animals to survive in a very cold climate in the forest ecosystem (Strip 3d).	The student demonstrates limited understanding typically requiring additional support through scaffolding.	1
Student… • is able to determine one animal adaptation that will help the animals to survive in a very cold climate in the forest ecosystem (Strip 3b or Strip 3d); ***and*** • is able to determine another animal adaptation that will help the animals to survive in a very cold climate in the forest ecosystem (Strip 3b **or** Strip 3d).	The student demonstrates understanding independently without scaffolding.	2

ACTIVITY 9

Essence Statement: CTAS-HS-LS4-4/5 Use evidence to explain how natural selection leads to adaptation, growth, and/or possible extinction of populations of organisms and/or species.

Core Extension 9: Given a scenario, use a graph or table to identify a cause and effect relationship between natural selection and an adaptation. (CTAS-HS-LS4-4/5)

Teacher Notes:

Collect the following resources for this activity:

- Activity 9 Resource 1: Bird Beaks Over Time Data Table Poster
- Activity 9 Resource 2: Sentence Strips 2a – 2d
  - Sentence Strip 2a – large
  - Sentence Strip 2b – small
  - Sentence Strip 2c – broken shells
  - Sentence Strip 2d – not grow

Steps to Follow:

1. | **SAY** | "In this activity, we are going to talk about birds that live in a forest. In this forest, birds with larger beaks eat larger seeds and birds with smaller beaks eat smaller seeds. Over time, most of the birds in the forest have large beaks." |

2. Display Resource 1: Bird Beaks Over Time Data Table Poster for the student.

3. Indicate Resource 1.

SAY	"This is a data table with the number of birds with large beaks and the number of birds with small beaks over time. The column headings are '**Time'**, '**Number of Birds with Large Beaks**', and '**Number of Birds with Small Beaks**'." Read each row of the data table. Say, "In Year 1, there were 100 birds with large beaks *(indicate data in the large beak column)* and 100 birds with small beaks *(indicate data in the small beak column)*. In Year 10, there were 150 birds with large beaks *(indicate data in the large beak column)* and 50 birds with small beaks *(indicate data in the small beak column)*. In Year 20, there were 175 birds with large beaks *(indicate data in the large beak column)* and 25 birds with small beaks *(indicate data in the small beak column)*."

4. | **ASK** | "What is the most likely cause for the change in beak size over time?" |

5. Provide Resource 2: Sentence Strips 2a – 2d to the student. Indicate and read each Sentence Strip.

   a. Indicate Sentence Strip 2a.

   | **SAY** | "Most of the seeds in the forest are large." |

   b. Indicate Sentence Strip 2b.

   | **SAY** | "Most of the seeds in the forest are small." |

c. Indicate Sentence Strip 2c.

SAY	"Most of the seeds have broken shells."

d. Indicate Sentence Strip 2d.

SAY	"Most of the seeds did not grow."

6.

ASK AGAIN	"What is the most likely cause for the change in beak size over time?"

7. Allow student to respond and record response. If no response or if incorrect response, proceed to scaffolding instructions.

8. Indicate Sentence Strip 2a.

SAY	"The most likely cause for the change in beak size over time is most of the seeds in the forest are large."

9.

SAY	"We are now finished with this activity."

Scoring Guidance and Scaffolding

Scaffolding:

1. After student makes first incorrect attempt, remove the incorrect Sentence Strip chosen by the student.

SAY	"[Insert description of incorrect Sentence Strip chosen by the student] is not the correct answer."

2.

ASK	"What is the most likely cause for the change in beak size over time?"

3. Provide remaining Resource 2: Sentence Strips 2a – 2d to the student. Indicate and read each remaining Sentence Strip.

a. Indicate Sentence Strip 2a.

SAY	"Most of the seeds in the forest are large."

b. Indicate Sentence Strip 2b.

SAY	"Most of the seeds in the forest are small."

c. Indicate Sentence Strip 2c.

SAY	"Most of the seeds have broken shells."

d. Indicate Sentence Strip 2d.

SAY	"Most of the seeds did not grow."

4.

ASK AGAIN	"What is the most likely cause for the change in beak size over time?"

5. Allow student to respond and record response.

6. Indicate Sentence Strip 2a.

SAY	"The most likely cause for the change in beak size over time is most of the seeds in the forest are large."

7.

SAY	"We are now finished with this activity."

The correct answer is as follows:

1. What is the most likely cause for the change in beak size over time?
    a. Sentence Strip 2a – Most of the seeds in the forest are large.

Content Guidance	Rating	Score
Student… • gives NO response. **OR** • is unable to identify the likely cause for the change in beak size over time (Sentence Strip 2a).	The student **does not** demonstrate understanding.	0
Student… • **after scaffolding,** is able to identify the likely cause for the change in beak size over time (Sentence Strip 2a).	The student demonstrates limited understanding typically requiring additional support through scaffolding.	1
Student • is able to identify the likely cause for the change in beak size over time (Sentence Strip 2a)**.**	The student demonstrates understanding independently without scaffolding.	2