

2007 KERA Core Content

Kentucky Down Under strives to help educators prepare studies based on Academic Expectations, Depth of Knowledge requirements and Core Content for Assessment. To better understand how Kentucky Down Under can help with these requirements, we offer this guide. The following is divided by each area of the park and then divided into Elementary, Middle and High School groups. If you have any questions please contact us at groups@kdu.com or 800-762-2869. We are here to help meet state requirements and provide a unique, hand-on learning adventure.

CAVE TOUR

The scientific explanation of the origins of the rocks and minerals of the central Kentucky cave region are discussed on the tour. The time factors in the formation of the cave and speleothems are explored. Discussion also focuses on water movement, the effects that surface activities have on the underground environment, and the importance of protecting our groundwater resources. Troglobites, the animals that live in caves, have adapted to the cave environment and their existence or extinction is an important indicator of the quality of the groundwater.

CAVE TOUR - ELEMENTARY

SC-04-1.1.1

Students will explain how matter, including water, can be changed from one state to another.

Materials can exist in different states--solid, liquid and gas. Some common materials, such as water, can be changed from one state to another by heating or cooling. Resulting cause and effect relationships should be explored, described and predicted. **DOK 3**

SC-EP-1.1.3

Students will describe the properties of water as it occurs as a solid, liquid or gas.

Matter (water) can exist in different states--solid, liquid and gas. Properties of those states of matter can be used to describe and classify them. **DOK 2**

SC-EP-2.3.1

Students will describe earth materials (solid rocks, soils, water and gases of the atmosphere) using their properties.

Earth materials include solid rocks and soils, water and the gases of the atmosphere. Minerals that make up rocks have properties of color, luster and hardness. Soils have properties of color, texture, the capacity to retain water and the ability to support plant growth. Water on Earth and in the atmosphere can be a solid, liquid or gas. **DOK 2**

SC-04-2.3.1

Students will:

- classify earth materials by the ways that they are used;
- explain how their properties make them useful for different purposes.

Earth materials provide many of the resources humans use. The varied materials have different physical properties that can be used to describe, separate, sort and classify them. Inferences about the unique properties of the earth materials yield ideas about their usefulness. For example, some are useful as building materials (e.g., stone, clay, marble), as sources of fuel (e.g., petroleum, natural gas), or for growing the plants we use as food. **DOK 2**

SC-05-2.3.1

Students will:

- describe the circulation of water (evaporation and condensation) from the surface of the Earth, through the crust, oceans and atmosphere (water cycle);
- explain how matter is conserved in this cycle.

Water, which covers the majority of the Earth's surface, circulates through the crust, oceans and atmosphere in what is known as the water cycle. This cycle maintains the world's supply of fresh water. Students should have experiences that contribute to the understanding of evaporation, condensation and the conservation of matter. **DOK 2**

SC-04-2.3.2

Students will describe and explain consequences of changes to the surface of the Earth, including some common fast changes (e.g., landslides, volcanic eruptions, earthquakes), and some common slow changes (e.g., erosion, weathering). The surface of the Earth changes. Some changes are due to slow processes such as erosion or weathering. Some changes are due to rapid processes such as landslides, volcanic eruptions and earthquakes. Analyzing the changes to identify cause and effect relationships helps to define and understand the consequences.

DOK 3

SC-05-2.3.2

Students will explain interactions of water with Earth materials and results of those interactions (e.g., dissolving minerals, moving minerals and gases). Water dissolves minerals and gases and may carry them to the oceans.

DOK 3

SC-EP-3.4.1

Students will explain the basic needs of organisms. Organisms have basic needs. For example, animals need air, water and food; plants need air, water, nutrients and light. Organisms can survive only in environments in which their needs can be met. **DOK 2**

SC-04-3.4.1

Students will:

- compare the different structures and functions of plants and animals that contribute to the growth, survival and reproduction of the organisms;
- make inferences about the relationship between structure and function in organisms.

Each plant or animal has structures that serve different functions in growth, survival and reproduction. For example, humans have distinct body structures for walking, holding, seeing and talking. Evidence about the relationship between structure and function should be used to make inferences and draw conclusions. **DOK 3**

SC-EP-3.4.3

Students will describe the basic structures and related functions of plants and animals that contribute to growth, reproduction and survival. Each plant or animal has observable structures that serve different functions in growth, survival and reproduction. For example, humans have distinct body structures for walking, holding, seeing and talking. These observable structures should be explored to sort, classify, compare and describe organisms.

DOK 2

SC-04-3.4.3

Students will compare a variety of life cycles of plants and animals in order to classify and make inferences about an organism. Plants and animals have life cycles that include the beginning of life, growth and development, reproduction and death. The details of a life cycle are different for different organisms. Models of organisms' life cycles should be used to classify and make inferences about an organism. **DOK 3**

SC-EP-3.4.4

Students will describe a variety of plant and animal life cycles to understand patterns of the growth, development, reproduction and death of an organism. Plants and animals have life cycles that include the beginning of life, growth and development, reproduction and death. The details of a life cycle are different for different organisms.

Observations of different life cycles should be made in order to identify patterns and recognize similarities and differences. **DOK 2**

SC-EP-3.5.1

Students will describe fossils as evidence of organisms that lived long ago, some of which may be similar to others that are alive today. Fossils found in Earth materials provide evidence about organisms that lived long ago and the nature of the environment at that time. Representations of fossils provide the basis for describing and drawing conclusions about the organisms and basic environments represented by them. **DOK 3**

SC-04-3.5.1

Students will use representations of fossils to:

- draw conclusions about the nature of the organisms and the basic environments that existed at the time;

- make inferences about the relationships to organisms that are alive today.

Fossils found in Earth materials provide evidence about organisms that lived long ago and the nature of the environment at that time. Representations of fossils provide the basis for describing and drawing conclusions about the organisms and basic environments represented by them. **DOK 3**

SC-05-3.5.1

Students will describe cause and effect relationships between enhanced survival/reproductive success and particular biological adaptations (e.g., changes in structures, behaviors, and/or physiology) to generalize about the diversity of populations of organisms. Biological change over time accounts for the diversity of populations developed through gradual processes over many generations. Examining cause and effect relationships between enhanced survival/reproductive success and biological adaptations (e.g., changes in structures, behaviors, and/or physiology), based on evidence gathered, creates the basis for explaining diversity. **DOK 2**

SC-05-3.5.2

Students will understand that all organisms must be able to obtain and use resources, grow, reproduce, and maintain stable internal conditions while living in a constantly changing external environment.

SC-EP-4.6.2

Students will describe evidence of the sun providing light and heat to the Earth. Simple observations and investigations begin to reveal that the Sun provides the light and heat necessary to maintain the temperature of Earth. Based on those experiences, the conclusion can be drawn that the Sun's light and heat are necessary to sustain life on Earth. **DOK 2**

SC-04-4.6.2

Students will:

- analyze data/evidence of the Sun providing light and heat to earth;
- use data/evidence to substantiate the conclusion that the Sun's light and heat are necessary to sustaining life on Earth.

Simple observations, experiments and data collection begin to reveal that the Sun provides the light and heat necessary to maintain the temperature of Earth. Evidence collected and analyzed should be used to substantiate the conclusion that the sun's light and heat are necessary to sustain life on Earth. **DOK 3**

SC-EP-4.7.1

Students will describe the cause and effect relationships existing between organisms and their environments. The world has many different environments. Organisms require an environment in which their needs can be met. When the environment changes some plants and animals survive and reproduce and others die or move to new locations. **DOK 2**

SC-04-4.7.1

Students will make predictions and/or inferences based on patterns of evidence related to the survival and reproductive success of organisms in particular environments. The world has many different environments. Distinct environments support the lives of different types of organisms. When the environment changes some plants and animals survive and reproduce and others die or move to new locations. Examples of environmental changes resulting in either increase or decrease in numbers of a particular organism should be explored in order to discover patterns and resulting cause and effect relationships between organisms and their environments (e.g., structures and behaviors that make an organism suited to a particular environment). Connections and conclusions should be made based on the data. **DOK 3**

SC-04-4.7.2

Students will:

- describe human interactions in the environment where they live;
- classify the interactions as beneficial or harmful to the environment using data/evidence to support conclusions.

All organisms, including humans, cause changes in the environment where they live. Some of these changes are detrimental to the organism or to other organisms; other changes are beneficial (e.g., dams benefit some aquatic

organisms but are detrimental to others). By evaluating the consequences of change using cause and effect relationships, solutions to real life situations/dilemmas can be proposed. **DOK 3**

SC-05-4.7.2

Students will understand that a population consists of all individuals of a species that occur together at a given place and time. All populations living together and the physical factors with which they interact compose an ecosystem.

SS-EP-4.1.3

Students will describe how different factors (e.g. rivers, mountains) influence where human activities are located in the community.

SS-04-4.1.3

Students will describe how different factors (e.g. rivers, mountains) influence where human activities were/are located in Kentucky.

SS-05-4.1.3

Students will describe how different factors (e.g. rivers, mountains) influence where human activities were/are located in the United States.

SS-05-4.1.4

Students explain how factors in one location can impact other locations (e.g., natural disasters, building dams).

SS-EP-4.2.1

Students will describe places on Earth's surface by their physical characteristics (e.g., climate, landforms, bodies of water).

SS-04-4.2.1

Students will compare regions in Kentucky and the United States by their human characteristics (e.g., language, settlement patterns, beliefs) and physical characteristics (e.g., climate, landforms, bodies of water). **DOK 2**

SS-EP-4.3.1

Students will describe patterns of human settlement in places and regions on the Earth's surface.

SS-04-4.3.1

Students will describe patterns of human settlement in regions of Kentucky and explain how these patterns were/are influenced by physical characteristics (e.g., climate, landforms, bodies of water). **DOK 2**

SS-05-4.3.1

Students will explain patterns of human settlement in the early development of the United States and explain how these patterns were influenced by physical characteristics (e.g., climate, landforms, bodies of water). **DOK 2**

SS-EP-4.4.1

Students will describe ways people adapt to/modify the physical environment to meet their basic needs (food, shelter, clothing). **DOK 1**

SS-04-4.4.1

Students will explain and give examples of how people adapted to/modified the physical environment (e.g., natural resources, physical geography, natural disasters) to meet their needs during the history of Kentucky and explain its impact on the environment today. **DOK 3**

SS-05-4.4.1

Students will explain and give examples of how people adapted to/modified the physical environment (e.g., natural resources, physical geography, natural disasters) to meet their needs during the history of the U.S. (Colonization, Expansion) and analyze the impact on their environment. **DOK 3**

SS-EP-4.4.2

Students will describe how the physical environment can both promote and restrict human activities.

SS-04-4.4.2

Students will describe how the physical environment (e.g., mountains as barriers for protection, rivers as barriers of transportation) both promoted and restricted human activities during the early settlement of Kentucky. **DOK 2**

SS-05-4.4.2

Students will describe how the physical environment (e.g., mountains as barriers for protection, rivers as barriers of transportation) both promoted and restricted human activities during the early settlement of the U.S. (Colonization, Expansion). **DOK 2**

SS-05-4.4.3

Students will describe how individuals/groups may have different perspectives about the use of land (e.g., farming, industrial, residential, recreational).

SS-EP-5.1.1

Students will use a variety of primary and secondary sources (e.g., artifacts, diaries, timelines) to interpret the past.

SS-04-5.1.1

Students will use a variety of primary and secondary sources (e.g., artifacts, diaries, timelines) to describe significant events in the history of Kentucky and interpret different perspectives. **DOK 2**

SS-05-5.1.1

Students will use a variety of primary and secondary sources (e.g., artifacts, diaries, maps, timelines) to describe significant events in the history of the U.S. and interpret different perspectives. **DOK 3**

CAVE TOUR: MIDDLE SCHOOL LEVEL**SC-07-2.3.1**

Students will make inferences and predictions related to changes in the Earth's surface or atmosphere based on data/evidence. The Earth's processes we see today, including erosion, movement of lithospheric plates and changes in atmospheric composition, are predictable and similar to those that occurred in the past. Analysis of evidence from Earth's history substantiates the conclusion that the planet has also been influenced by occasional catastrophes such as the impact of an asteroid or comet. **DOK 3**

SC-08-2.3.1

Students will describe various techniques for estimating geological time (radioactive dating, observing rock sequences, comparing fossils). Techniques used to estimate geological time include using radioactive dating, observing rock sequences and comparing fossils to correlate the rock sequences at various locations. Deductions can be made based on available data and observation of models as to the age of rocks/fossils. **DOK 2**

SC-06-2.3.2

Students will explain cause and effect relationships in the Rock cycle. Materials found in the lithosphere and mantle are changed in a continuous process called the rock cycle, which can be investigated using a variety of models. **DOK 2**

SC-07-2.3.2

Students will explain the layers of the Earth and their interactions. The use of models/diagrams/graphs helps illustrate that the Earth is layered. The lithosphere is the thin crust and the upper part of the mantle. Lithospheric plates move slowly in response to movements in the mantle. There is a dense core at the center of the Earth. **DOK 2**

SC-08-2.3.2

Students will understand that earthquakes and volcanic eruptions can be observed on a human time scale, but many processes, such as mountain building and plate movements, take place over hundreds of millions of years.

SC-06-2.3.3

Students will compare constructive and destructive forces on Earth in order to make predictions about the nature of landforms. Landforms are a result of a combination of constructive and destructive forces. Collection and analysis of

data indicates that constructive forces include crustal deformation, faulting, volcanic eruption and deposition of sediment, while destructive forces include weathering and erosion. **DOK 2**

SC-06-3.5.1

Students will explain that biological change over time accounts for the diversity of species developed through gradual processes over many generations. Biological adaptations include changes in structures, behaviors, or physiology that enhance survival and reproductive success in a particular environment. **DOK 2**

SC-07-3.5.1

Students will:

- describe the usefulness of fossil information to make conclusions about past life forms and environmental conditions;
- explain the cause and effect relationship of the extinction of a species and environmental changes.

Extinction of species is common and occurs when the adaptive characteristics of a species are insufficient to allow its survival. Most of the species that have lived on Earth no longer exist. Fossils provide evidence of how environmental conditions and life have changed. **DOK 3**

SC-08-3.5.1

Students will draw conclusions and make inferences about the consequences of change over time that can account for the similarities among diverse species. The consequences of change over time provide a scientific explanation for the fossil record of ancient life forms and for the striking molecular similarities observed among the diverse species of living organisms. **DOK 3**

SC-06-4.7.1

Students will describe the consequences of change in one or more abiotic factors on a population within an ecosystem. The number of organisms an ecosystem can support depends on the resources available and abiotic factors (e.g., quantity of light and water, range of temperatures, soil composition). **DOK 2**

SC-07-4.7.1

Students will compare abiotic and biotic factors in an ecosystem in order to explain consequences of change in one or more factors. The number of organisms an ecosystem can support depends on the resources available and abiotic factors (e.g., quantity of light and water, range of temperatures, soil composition). Given adequate biotic and abiotic resources and no diseases or predators, populations (including humans) increase at rapid rates. Lack of resources and other factors, such as predation and climate, limit the growth of populations in specific niches in the ecosystem. **DOK 3**

SC-08-4.7.1

Students will describe the interrelationships and interdependencies within an ecosystem and predict the effects of change on one or more components within an ecosystem. Organisms both cooperate and compete in ecosystems. Often changes in one component of an ecosystem will have effects on the entire system that are difficult to predict. The interrelationships and interdependencies of these organisms may generate ecosystems that are stable for hundreds or thousands of years. **DOK 3**

SC-08-4.7.2

Students will:

- explain the interactions of the components of the Earth system (e.g., solid Earth, oceans, atmosphere, living organisms);
- propose solutions to detrimental interactions.

Interactions among the solid Earth, the oceans, the atmosphere and living things have resulted in the ongoing development of a changing Earth system. **DOK 3**

SS-06-4.4.3

Students will explain how the natural resources of a place or region impact its political, social and economic development in the present day.

SS-07-4.4.3

Students will explain how the natural resources of a place or region impact its political, social and economic development in early civilizations prior to 1500 A.D.

SS-08-4.4.3

Students will explain how the natural resources of a place or region impact its political, social and economic development in the United States prior to Reconstruction.

CAVE TOUR: HIGH SCHOOL LEVEL

SC-HS-1.1.8

Students will:

- explain the importance of chemical reactions in a real-world context;
- justify conclusions using evidence/data from chemical reactions.

Chemical reactions (e.g., acids and bases, oxidation, combustion of fuels, rusting, tarnishing) occur all around us and in every cell in our bodies. These reactions may release or absorb energy. **DOK 3**

SC-HS-2.3.6

Students will:

- compare the limitations/benefits of various techniques (radioactive dating, observing rock sequences and comparing fossils) for estimating geological time;
- justify deductions about age of geologic features.

Techniques used to estimate geological time include using radioactive dating, observing rock sequences and comparing fossils to correlate the rock sequences at various locations. **DOK 3**

SC-HS-2.3.8

Students will predict consequences of both rapid (volcanoes, earthquakes) and slow (mountain building, plate movement) earth processes from evidence/data and justify reasoning. The Earth's surface is dynamic; earthquakes and volcanic eruptions can be observed on a human time scale, but many processes, such as mountain building and plate movements, take place over hundreds of millions of years. **DOK 3**

SC-HS-3.5.1

Students will:

- predict the impact on species of changes to 1) the potential for a species to increase its numbers, (2) the genetic variability of offspring due to mutation and recombination of genes, (3) a finite supply of the resources required for life, or (4) natural selection;
- propose solutions to real-world problems of endangered and extinct species.

Species change over time. Biological change over time is the consequence of the interactions of (1) the potential for a species to increase its numbers, (2) the genetic variability of offspring due to mutation and recombination of genes, (3) a finite supply of the resources required for life and (4) natural selection. The consequences of change over time provide a scientific explanation for the fossil record of ancient life forms and for the striking molecular similarities observed among the diverse species of living organisms. Changes in DNA (mutations) occur spontaneously at low rates. Some of these changes make no difference to the organism, whereas others can change cells and organisms. Only mutations in germ cells have the potential to create the variation that changes an organism's future offspring. **DOK 3**

SC-HS-3.5.2

Students will:

- predict the success of patterns of adaptive behaviors based on evidence/data;
- justify explanations of organism survival based on scientific understandings of behavior.

The broad patterns of behavior exhibited by organisms have changed over time through natural selection to ensure reproductive success. Organisms often live in unpredictable environments, so their behavioral responses must be flexible enough to deal with uncertainty and change. Behaviors often have an adaptive logic. **DOK 3**

SS-HS-4.2.2

Students will explain how physical (e.g., climate, mountains, rivers) and human characteristics (e.g., interstate highways, urban centers, workforce) of regions create advantages and disadvantages for human activities in a specific place. **DOK 2**

SC-HS-4.6.4

Students will:

- describe the components and reservoirs involved in biogeochemical cycles (water, nitrogen, carbon dioxide and oxygen);
- explain the movement of matter and energy in biogeochemical cycles and related phenomena.

The total energy of the universe is constant. Energy can change forms and/or be transferred in many ways, but it can neither be created nor destroyed. Movement of matter between reservoirs is driven by Earth's internal and external sources of energy. These movements are often accompanied by a change in physical and chemical properties of the matter. Carbon, for example, occurs in carbonate rocks such as limestone, in the atmosphere as carbon dioxide gas, in water as dissolved carbon dioxide and in all organisms as complex molecules that control the chemistry of life. **DOK 3**

SC-HS-4.7.1

Students will:

- analyze relationships and interactions among organisms in ecosystems;
- predict the effects on other organisms of changes to one or more components of the ecosystem.

Organisms both cooperate and compete in ecosystems. Often changes in one component of an ecosystem will have effects on the entire system that are difficult to predict. The interrelationships and interdependencies of these organisms may generate ecosystems that are stable for hundreds or thousands of years. **DOK 3**

SC-HS-4.7.2

Students will:

- evaluate proposed solutions from multiple perspectives to environmental problems caused by human interaction;
- justify positions using evidence/data.

Human beings live within the world's ecosystems. Human activities can deliberately or inadvertently alter the dynamics in ecosystems. These activities can threaten current and future global stability and, if not addressed, ecosystems can be irreversibly affected. **DOK 3**

SC-HS-4.7.3

Students will:

predict the consequences of changes to any component (atmosphere, solid Earth, oceans, living things) of the Earth System; propose justifiable solutions to global problems. Interactions among the solid Earth, the oceans, the atmosphere and living things have resulted in the ongoing development of a changing Earth system. **DOK 3**

SC-HS-4.7.5

Students will:

- predict the consequences of changes in resources to a population;
- select or defend solutions to real-world problems of population control.

Living organisms have the capacity to produce populations of infinite size. However, behaviors, environments and resources influence the size of populations. Models (e.g., mathematical, physical, conceptual) can be used to make predictions about changes in the size or rate of growth of a population. **DOK 3**

SS-HS-5.1.2

Students will analyze how history is a series of connected events shaped by multiple cause and effect relationships, tying past to present. **DOK 3**

WOOLSHED

The reasons for the European importation of sheep into Australia and the impact it had on the environment are explored. Australian climate and resources had a large influence on the size and isolation of a sheep station, which in turn had a major impact on human lifestyles. Also discussed is genetic breeding for desired traits in sheep.

WOOLSHED: ELEMENTARY LEVEL

SS-EP-3.1.1

Students will define basic economic terms related to scarcity (e.g., opportunity cost, wants and needs, limited productive resources-natural, human, capital) and explain that scarcity requires people to make economic choices and incur opportunity costs. **DOK 2**

SS-EP-3.4.3

Students will define interdependence and give examples of how people in our communities, states, nation and world depend on each other for goods and services.

SS-04-3.4.3

Students will define interdependence and give examples of how people in our communities, states, nation and world depend on each other for goods and services.

SS-05-3.4.3

Students will define interdependence and give examples of how people in our communities, states, nation and world depend on each other for goods and services.

SS-EP-4.1.3

Students will describe how different factors (e.g. rivers, mountains) influence where human activities are located in the community

SS-EP-4.2.1

Students will describe places on Earth's surface by their physical characteristics (e.g., climate, landforms, bodies of water).

SS-EP-4.3.1

Students will describe patterns of human settlement in places and regions on the Earth's surface.

SS-EP-4.4.1

Students will describe ways people adapt to/modify the physical environment to meet their basic needs (food, shelter, clothing). **DOK 1**

SS-EP-4.4.2

Students will describe how the physical environment can both promote and restrict human activities.

SC-EP-3.4.1

Students will explain the basic needs of organisms. Organisms have basic needs. For example, animals need air, water and food; plants need air, water, nutrients and light. Organisms can survive only in environments in which their needs can be met. **DOK 2**

SC-04-3.4.1

Students will:

- compare the different structures and functions of plants and animals that contribute to the growth, survival and reproduction of the organisms;
- make inferences about the relationship between structure and function in organisms.

Each plant or animal has structures that serve different functions in growth, survival and reproduction. For example, humans have distinct body structures for walking, holding, seeing and talking. Evidence about the relationship between structure and function should be used to make inferences and draw conclusions. **DOK 3**

SC-05-3.4.1

Students will describe and compare living systems to understand the complementary nature of structure and function.

Observations and comparisons of living systems at all levels of organization illustrate the complementary nature of structure and function. Important levels of organization for structure and function include cells, tissues, organs, organ systems, organisms (e.g., bacteria, protists, fungi, plants, animals), and ecosystems. Examining the relationship between structure and function provides a basis for comparisons and classification schemes. **DOK 2**

SC-05-3.5.2

Students will understand that all organisms must be able to obtain and use resources, grow, reproduce, and maintain stable internal conditions while living in a constantly changing external environment.

SC-04-4.7.2

Students will:

- describe human interactions in the environment where they live;
- classify the interactions as beneficial or harmful to the environment using data/evidence to support conclusions.

All organisms, including humans, cause changes in the environment where they live. Some of these changes are detrimental to the organism or to other organisms; other changes are beneficial (e.g., dams benefit some aquatic organisms but are detrimental to others). By evaluating the consequences of change using cause and effect relationships, solutions to real life situations/dilemmas can be proposed. **DOK 3**

WOOLSHED: MIDDLE SCHOOL LEVEL

SS-06-3.3.1

Students will explain how in present day market economies, the prices of goods and services are determined by supply and demand. **DOK 2**

SS-06-3.3.2

Students will explain how money (unit of account) can be used to express the market value of goods and services and how money makes it easier to trade, borrow, invest and save in the present day.

SS-06-4.1.2

Students will describe how different factors (e.g., rivers, mountains, plains) affect where human activities are located in the present day.

SS-06-4.2.1

Students will describe how regions in the present day are made distinctive by human characteristics (e.g., dams, roads, urban centers) and physical characteristics (e.g., mountains, bodies of water, valleys) that create advantages and disadvantages for human activities (e.g., exploration, migration, trade, settlement, development). **DOK 2**

SS-06-4.2.2

Students will describe and give examples of how places and regions in the present day change over time as technologies, resources and knowledge become available. **DOK 2**

SS-06-4.3.1

Students will describe patterns of human settlement in the present day and explain how these patterns are influenced by human needs. **DOK 2**

SS-06-4.3.2

Students will explain why and give examples of how human populations may change and/or migrate because of factors such as war, famine, disease, economic opportunity and technology in the present day. **DOK 3**

SS-06-4.4.1

Students will explain how technology in the present day assists human modification (e.g., irrigation, clearing land, building roads) of the physical environment in regions. **DOK 2**

SS-06-4.4.2

Students will describe ways in which the physical environment (e.g., natural resources, physical geography, natural disasters) both promotes and limits human activities (e.g., exploration, migration, trade, settlement, development) in the present day. **DOK 2**

SS-06-4.4.3

Students will explain how the natural resources of a place or region impact its political, social and economic development in the present day.

SS-06-4.4.4

Students will explain how individual and group perspectives impact the use of natural resources (e.g., urban development, recycling) in the present day.

SC-07-3.4.1

Students will:

- describe the role of genes/chromosomes in the passing of information from one generation to another (heredity);
- compare inherited and learned traits.

Every organism requires a set of instructions for specifying its traits. This information is contained in genes located in the chromosomes of each cell that can be illustrated through the use of models. Heredity is the passage of these instructions from one generation to another and should be distinguished from learned traits. **DOK 2**

SC-06-3.4.2

Students will make inferences about the factors influencing behavior based on data/evidence of various organism's behaviors. Behavior is one kind of response an organism may make to an internal or environmental stimulus. Observations of organisms, data collection/analysis, support generalizations/conclusions that a behavioral response is a set of actions determined in part by heredity and in part from experience. A behavioral response requires coordination and communication at many levels including cells, organ systems and organisms. **DOK 2**

SC-08-3.4.3

Students will form or justify conclusions as to whether a response is innate or learned using data/evidence on behavioral responses to internal and external stimuli. Behavioral responses to internal changes and external stimuli can be innate or learned. Responses to external stimuli can result from interactions with the organism's own species or other species, as well as environmental changes. **DOK 3**

SC-06-3.5.1

Students will explain that biological change over time accounts for the diversity of species developed through gradual processes over many generations. Biological adaptations include changes in structures, behaviors, or physiology that enhance survival and reproductive success in a particular environment. **DOK 2**

SC-06-3.5.2

Students will understand that regulation of an organism's internal environment involves sensing the internal environment and changing physiological activities to keep conditions within the range required to survive. Maintaining a stable internal environment is essential for an organism's survival.

SC-06-4.7.1

Students will describe the consequences of change in one or more abiotic factors on a population within an ecosystem. The number of organisms an ecosystem can support depends on the resources available and abiotic factors (e.g., quantity of light and water, range of temperatures, soil composition). **DOK 2**

SC-07-4.7.1

Students will compare abiotic and biotic factors in an ecosystem in order to explain consequences of change in one or more factors. The number of organisms an ecosystem can support depends on the resources available and abiotic factors (e.g., quantity of light and water, range of temperatures, soil composition). Given adequate biotic and

abiotic resources and no diseases or predators, populations (including humans) increase at rapid rates. Lack of resources and other factors, such as predation and climate, limit the growth of populations in specific niches in the ecosystem. **DOK 3**

SC-08-4.7.1

Students will describe the interrelationships and interdependencies within an ecosystem and predict the effects of change on one or more components within an ecosystem. Organisms both cooperate and compete in ecosystems. Often changes in one component of an ecosystem will have effects on the entire system that are difficult to predict. The interrelationships and interdependencies of these organisms may generate ecosystems that are stable for hundreds or thousands of years. **DOK 3**

WOOLSHED: HIGH SCHOOL LEVEL

SS-HS-2.2.1

Students will explain how various human needs are met through interaction in and among social institutions (e.g., family, religion, education, government, economy) in the modern world (1500 A.D. to present) and the United States (Reconstruction to present).

SS-HS-3.1.1

Students will give examples of and explain how scarcity of resources necessitates choices at both the personal and societal levels in the modern world (1500 A.D. to present) and the United States (Reconstruction to present) and explain the impact of those choices. **DOK 2**

SS-HS-4.2.2

Students will explain how physical (e.g., climate, mountains, rivers) and human characteristics (e.g., interstate highways, urban centers, workforce) of regions create advantages and disadvantages for human activities in a specific place. **DOK 2**

SS-HS-4.3.1

Students will describe the movement and settlement patterns of people in various places and analyze the causes of that movement and settlement (e.g., push factors such as famines or military conflicts; pull factors such as climate or economic opportunity) and the impacts in the modern world (1500 A.D. to present) and United States (Reconstruction to present). **DOK 3**

SS-HS-4.4.1

Students will explain how humans develop strategies (e.g., transportation, communication, technology) to overcome limits of their physical environment.

SS-HS-4.4.3

Students will explain how group and individual perspectives impact the use of natural resources (e.g., mineral extraction, land reclamation).

SC-HS-3.5.1

Students will:

- predict the impact on species of changes to 1) the potential for a species to increase its numbers, (2) the genetic variability of offspring due to mutation and recombination of genes, (3) a finite supply of the resources required for life, or (4) natural selection;
- propose solutions to real-world problems of endangered and extinct species.

Species change over time. Biological change over time is the consequence of the interactions of (1) the potential for a species to increase its numbers, (2) the genetic variability of offspring due to mutation and recombination of genes, (3) a finite supply of the resources required for life and (4) natural selection. The consequences of change over time provide a scientific explanation for the fossil record of ancient life forms and for the striking molecular similarities observed among the diverse species of living organisms. Changes in DNA (mutations) occur spontaneously at low rates. Some of these changes make no difference to the organism, whereas others can change cells and organisms. Only mutations in germ cells have the potential to create the variation that changes an organism's future offspring. **DOK 3**

SC-HS-3.5.2

Students will:

- predict the success of patterns of adaptive behaviors based on evidence/data;
- justify explanations of organism survival based on scientific understandings of behavior.

The broad patterns of behavior exhibited by organisms have changed over time through natural selection to ensure reproductive success. Organisms often live in unpredictable environments, so their behavioral responses must be flexible enough to deal with uncertainty and change. Behaviors often have an adaptive logic. **DOK 3**

SC-HS-4.7.1

Students will:

- analyze relationships and interactions among organisms in ecosystems;
- predict the effects on other organisms of changes to one or more components of the ecosystem.

Organisms both cooperate and compete in ecosystems. Often changes in one component of an ecosystem will have effects on the entire system that are difficult to predict. The interrelationships and interdependencies of these organisms may generate ecosystems that are stable for hundreds or thousands of years. **DOK 3**

SC-HS-4.7.2

Students will:

- evaluate proposed solutions from multiple perspectives to environmental problems caused by human interaction;
- justify positions using evidence/data.

Human beings live within the world's ecosystems. Human activities can deliberately or inadvertently alter the dynamics in ecosystems. These activities can threaten current and future global stability and, if not addressed, ecosystems can be irreversibly affected. **DOK 3**

SC-HS-4.7.5

Students will:

- predict the consequences of changes in resources to a population;
- select or defend solutions to real-world problems of population control.

Living organisms have the capacity to produce populations of infinite size. However, behaviors, environments and resources influence the size of populations. Models (e.g., mathematical, physical, conceptual) can be used to make predictions about changes in the size or rate of growth of a population. **DOK 3**

OUTBACK

The animals that live in the Outback of Australia have adapted to the extreme temperatures and limited resources found there. Specialized reproductive and digestive systems, modes of locomotion, and methods of communication are discussed on this tour. The impact of animals introduced by the Europeans on the Australian native animals is also explained.

OUTBACK: ELEMENTARY SCHOOL LEVEL

SC-EP-3.4.1

Students will explain the basic needs of organisms. Organisms have basic needs. For example, animals need air, water and food; plants need air, water, nutrients and light. Organisms can survive only in environments in which their needs can be met. **DOK2**

SC-04-3.4.1

Students will:

- compare the different structures and functions of plants and animals that contribute to the growth, survival and reproduction of the organisms;
- make inferences about the relationship between structure and function in organisms.

Each plant or animal has structures that serve different functions in growth, survival and reproduction. For example, humans have distinct body structures for walking, holding, seeing and talking. Evidence about the relationship between structure and function should be used to make inferences and draw conclusions. **DOK 3**

SC-05-3.4.1

Students will describe and compare living systems to understand the complementary nature of structure and function. Observations and comparisons of living systems at all levels of organization illustrate the complementary nature of structure and function. Important levels of organization for structure and function include cells, tissues, organs, organ systems, organisms (e.g., bacteria, protists, fungi, plants, animals), and ecosystems. Examining the relationship between structure and function provides a basis for comparisons and classification schemes. **DOK2**

SC-EP-3.4.2

Students will understand that things in the environment are classified as living, nonliving and once living. Living things differ from nonliving things. Organisms are classified into groups by using various characteristics (e.g., body coverings, body structures).

SC-04-3.4.2

Students will understand that things in the environment are classified as living, nonliving and once living. Living things differ from nonliving things. Organisms are classified into groups by using various characteristics (e.g., body coverings, body structures).

SC-EP-3.4.3

Students will describe the basic structures and related functions of plants and animals that contribute to growth, reproduction and survival. Each plant or animal has observable structures that serve different functions in growth, survival and reproduction. For example, humans have distinct body structures for walking, holding, seeing and talking. These observable structures should be explored to sort, classify, compare and describe organisms. **DOK 2**

SC-04-3.4.3

Students will compare a variety of life cycles of plants and animals in order to classify and make inferences about an organism. Plants and animals have life cycles that include the beginning of life, growth and development, reproduction and death. The details of a life cycle are different for different organisms. Models of organisms' life cycles should be used to classify and make inferences about an organism. **DOK 3**

SC-EP-3.4.4

Students will describe a variety of plant and animal life cycles to understand patterns of the growth, development, reproduction and death of an organism. Plants and animals have life cycles that include the beginning of life, growth and development, reproduction and death. The details of a life cycle are different for different organisms.

Observations of different life cycles should be made in order to identify patterns and recognize similarities and differences. **DOK 2**

SC-04-3.4.4

Students will identify some characteristics of organisms that are inherited from the parents and others that are learned from interactions with the environment. Observations of plants and animals yield the conclusion that organisms closely resemble their parents at some time in their life cycle. Some characteristics (e.g., the color of flowers, the number of appendages) are passed to offspring. Other characteristics are learned from interactions with the environment, such as the ability to ride a bicycle, and these cannot be passed on to the next generation. Explorations related to inherited versus learned characteristics should offer opportunities to collect data and draw conclusions about various groups of organisms. **DOK 2**

SC-05-3.5.1

Students will describe cause and effect relationships between enhanced survival/reproductive success and particular biological adaptations (e.g., changes in structures, behaviors, and/or physiology) to generalize about the diversity of populations of organisms. Biological change over time accounts for the diversity of populations developed through gradual processes over many generations. Examining cause and effect relationships between enhanced survival/reproductive success and biological adaptations (e.g., changes in structures, behaviors, and/or physiology), based on evidence gathered, creates the basis for explaining diversity. **DOK 2**

SC-05-3.5.2

Students will understand that all organisms must be able to obtain and use resources, grow, reproduce, and maintain stable internal conditions while living in a constantly changing external environment.

SC-EP-4.6.1

Students will describe basic relationships of plants and animals in an ecosystem (food chains). Plants make their own food. All animals depend on plants. Some animals eat plants for food. Other animals eat animals that eat the plants. Basic relationships and connections between organisms in food chains can be used to discover patterns within ecosystems. **DOK 2**

SC-04-4.6.1

Students will analyze patterns and make generalizations about the basic relationships of plants and animals in an ecosystem (food chain). Plants make their own food. All animals depend on plants. Some animals eat plants for food. Other animals eat animals that eat the plants. Basic relationships and connections between organisms in food chains, including the flow of energy, can be used to discover patterns within ecosystems. **DOK 2**

SC-EP-4.7.1

Students will describe the cause and effect relationships existing between organisms and their environments. The world has many different environments. Organisms require an environment in which their needs can be met. When the environment changes some plants and animals survive and reproduce and others die or move to new locations. **DOK 2**

SC-04-4.7.1

Students will make predictions and/or inferences based on patterns of evidence related to the survival and reproductive success of organisms in particular environments. The world has many different environments. Distinct environments support the lives of different types of organisms. When the environment changes some plants and animals survive and reproduce and others die or move to new locations. Examples of environmental changes resulting in either increase or decrease in numbers of a particular organism should be explored in order to discover patterns and resulting cause and effect relationships between organisms and their environments (e.g., structures and behaviors that make an organism suited to a particular environment). Connections and conclusions should be made based on the data. **DOK 3**

SC-05-4.7.1

Students will:

- describe and categorize populations of organisms according to the function they serve in an ecosystem (e.g., producers, consumers, decomposers);
- draw conclusions about the effects of changes to populations in an ecosystem.

Populations of organisms can be categorized by the function they serve in an ecosystem. Plants and some microorganisms are producers because they make their own food. All animals, including humans, are consumers, and obtain their food by eating other organisms. Decomposers, primarily bacteria and fungi, are consumers that use waste materials and dead organisms for food. Food webs identify the relationships among producers, consumers and decomposers in an ecosystem. Using data gained from observing interacting components within an ecosystem, the effects of changes can be predicted. **DOK 3**

SC-04-4.7.2

Students will:

- describe human interactions in the environment where they live;
- classify the interactions as beneficial or harmful to the environment using data/evidence to support conclusions.

All organisms, including humans, cause changes in the environment where they live. Some of these changes are detrimental to the organism or to other organisms; other changes are beneficial (e.g., dams benefit some aquatic organisms but are detrimental to others). By evaluating the consequences of change using cause and effect relationships, solutions to real life situations/dilemmas can be proposed. **DOK 3**

SC-05-4.7.2

Students will understand that a population consists of all individuals of a species that occur together at a given place and time. All populations living together and the physical factors with which they interact compose an ecosystem.

SS-EP-4.4.2

Students will describe how the physical environment can both promote and restrict human activities.

SS-05-4.4.3

Students will describe how individuals/groups may have different perspectives about the use of land (e.g., farming, industrial, residential, recreational).

OUTBACK-MIDDLE SCHOOL LEVEL

SC-07-3.4.1

Students will:

- describe the role of genes/chromosomes in the passing of information from one generation to another (heredity);
- compare inherited and learned traits.

Every organism requires a set of instructions for specifying its traits. This information is contained in genes located in the chromosomes of each cell that can be illustrated through the use of models. Heredity is the passage of these instructions from one generation to another and should be distinguished from learned traits. **DOK 2**

SC-07-3.4.2

Students will describe and compare sexual and asexual reproduction. Reproduction is a characteristic of all living systems and is essential to the continuation of every species as evidenced through observable patterns. A distinction should be made between organisms that reproduce asexually and those that reproduce sexually. In species that reproduce sexually, including humans and plants, male and female sex cells carrying genetic information unite to begin the development of a new individual. **DOK 2**

SC-06-3.4.2

Students will make inferences about the factors influencing behavior based on data/evidence of various organism's behaviors. Behavior is one kind of response an organism may make to an internal or environmental stimulus. Observations of organisms, data collection/analysis, support generalizations/conclusions that a behavioral response is a set of actions determined in part by heredity and in part from experience. A behavioral response requires coordination and communication at many levels including cells, organ systems and organisms. **DOK 2**

SC-08-3.4.3

Students will form or justify conclusions as to whether a response is innate or learned using data/evidence on behavioral responses to internal and external stimuli. Behavioral responses to internal changes and external stimuli can be innate or learned. Responses to external stimuli can result from interactions with the organism's own species or other species, as well as environmental changes. **DOK 3**

SC-08-3.4.4

Students will describe and explain patterns found within groups of organisms in order to make biological classifications of those organisms. Observations and patterns found within groups of organisms allow for biological classifications based on how organisms are related. **DOK 2**

SC-06-3.5.1

Students will explain that biological change over time accounts for the diversity of species developed through gradual processes over many generations. Biological adaptations include changes in structures, behaviors, or physiology that enhance survival and reproductive success in a particular environment. **DOK 2**

SC-08-3.5.1

Students will draw conclusions and make inferences about the consequences of change over time that can account for the similarities among diverse species. The consequences of change over time provide a scientific explanation for the fossil record of ancient life forms and for the striking molecular similarities observed among the diverse species of living organisms. **DOK 3**

SC-06-3.5.2

Students will understand that regulation of an organism's internal environment involves sensing the internal environment and changing physiological activities to keep conditions within the range required to survive. Maintaining a stable internal environment is essential for an organism's survival.

SC-06-4.7.1

Students will describe the consequences of change in one or more abiotic factors on a population within an ecosystem. The number of organisms an ecosystem can support depends on the resources available and abiotic factors (e.g., quantity of light and water, range of temperatures, soil composition). **DOK 2**

SC-07-4.7.1

Students will compare abiotic and biotic factors in an ecosystem in order to explain consequences of change in one or more factors. The number of organisms an ecosystem can support depends on the resources available and abiotic factors (e.g., quantity of light and water, range of temperatures, soil composition). Given adequate biotic and abiotic resources and no diseases or predators, populations (including humans) increase at rapid rates. Lack of resources and other factors, such as predation and climate, limit the growth of populations in specific niches in the ecosystem. **DOK 3**

SC-08-4.7.1

Students will describe the interrelationships and interdependencies within an ecosystem and predict the effects of change on one or more components within an ecosystem. Organisms both cooperate and compete in ecosystems. Often changes in one component of an ecosystem will have effects on the entire system that are difficult to predict. The interrelationships and interdependencies of these organisms may generate ecosystems that are stable for hundreds or thousands of years. **DOK 3**

SS-06-4.1.2

Students will describe how different factors (e.g., rivers, mountains, plains) affect where human activities are located in the present day.

SS-06-4.2.1

Students will describe how regions in the present day are made distinctive by human characteristics (e.g., dams, roads, urban centers) and physical characteristics (e.g., mountains, bodies of water, valleys) that create advantages and disadvantages for human activities (e.g., exploration, migration, trade, settlement, development). **DOK 2**

SS-06-4.3.2

Students will explain why and give examples of how human populations may change and/or migrate because of factors such as war, famine, disease, economic opportunity and technology in the present day. **DOK 3**

SS-06-4.4.2

Students will describe ways in which the physical environment (e.g., natural resources, physical geography, natural disasters) both promotes and limits human activities (e.g., exploration, migration, trade, settlement, development) in the present day. **DOK 2**

OUTBACK-HIGH SCHOOL LEVEL

SC-HS-3.4.7

Students will:

- classify organisms into groups based on similarities;
- infer relationships based on internal and external structures and chemical processes.

Biological classifications are based on how organisms are related. Organisms are classified into a hierarchy of groups and subgroups based on similarities that reflect their relationships. Species is the most fundamental unit of classification. Different species are classified by the comparison and analysis of their internal and external structures and the similarity of their chemical processes. **DOK 2**

SC-HS-3.4.8

Students will understand that multicellular animals have nervous systems that generate behavior. Nerve cells communicate with each other by secreting specific molecules. Specialized cells in sense organs detect light, sound and specific chemicals enabling animals to monitor what is going on in the world around them.

SC-HS-3.5.1

Students will:

- predict the impact on species of changes to 1) the potential for a species to increase its numbers, (2) the genetic variability of offspring due to mutation and recombination of genes, (3) a finite supply of the resources required for life, or (4) natural selection;
- propose solutions to real-world problems of endangered and extinct species.

Species change over time. Biological change over time is the consequence of the interactions of (1) the potential for a species to increase its numbers, (2) the genetic variability of offspring due to mutation and recombination of genes, (3) a finite supply of the resources required for life and (4) natural selection. The consequences of change over time provide a scientific explanation for the fossil record of ancient life forms and for the striking molecular similarities observed among the diverse species of living organisms. Changes in DNA (mutations) occur spontaneously at low rates. Some of these changes make no difference to the organism, whereas others can change cells and organisms. Only mutations in germ cells have the potential to create the variation that changes an organism's future offspring. **DOK 3**

SC-HS-3.5.2

Students will:

- predict the success of patterns of adaptive behaviors based on evidence/data;
- justify explanations of organism survival based on scientific understandings of behavior.

The broad patterns of behavior exhibited by organisms have changed over time through natural selection to ensure reproductive success. Organisms often live in unpredictable environments, so their behavioral responses must be flexible enough to deal with uncertainty and change. Behaviors often have an adaptive logic.

SC-HS-4.7.1

Students will:

- analyze relationships and interactions among organisms in ecosystems;
- predict the effects on other organisms of changes to one or more components of the ecosystem.

Organisms both cooperate and compete in ecosystems. Often changes in one component of an ecosystem will have effects on the entire system that are difficult to predict. The interrelationships and interdependencies of these organisms may generate ecosystems that are stable for hundreds or thousands of years. **DOK 3**

SC-HS-4.7.2

Students will:

- evaluate proposed solutions from multiple perspectives to environmental problems caused by human interaction;
- justify positions using evidence/data.

Human beings live within the world's ecosystems. Human activities can deliberately or inadvertently alter the dynamics in ecosystems. These activities can threaten current and future global stability and, if not addressed, ecosystems can be irreversibly affected. **DOK 3**

SS-HS-4.2.2

Students will explain how physical (e.g., climate, mountains, rivers) and human characteristics (e.g., interstate highways, urban centers, workforce) of regions create advantages and disadvantages for human activities in a specific place. **DOK 2**

SS-HS-4.4.1

Students will explain how humans develop strategies (e.g., transportation, communication, technology) to overcome limits of their physical environment.

CORROBOREE

This program explores the Australian Aboriginal culture prior to European settlement of the continent. Their relationship to the environment, their stories, and their beliefs are discussed during this interactive presentation.

CORROBOREE: ELEMENTARY LEVEL

SS-EP-2.1.1

Students will describe cultural elements (e.g., beliefs, traditions, languages, skills, literature, the arts). **DOK 1**

SS-EP-2.1.2

Students will study a variety of diverse cultures locally and in the world today and explain the importance of appreciating and understanding other cultures.

SS-EP-2.2.1

Students will identify social institutions (government, economy, education, religion, family) and explain how they help the community.

SS-EP-2.3.1

Students will describe various forms of interactions (compromise, cooperation, conflict, competition) that occur between individuals/ groups at home and at school. **DOK 2**

SS-EP-2.3.2

Students will identify appropriate conflict resolution strategies (e.g., compromise, cooperation, communication).

SS-EP-3.1.1

Students will define basic economic terms related to scarcity (e.g., opportunity cost, wants and needs, limited productive resources-natural, human, capital) and explain that scarcity requires people to make economic choices and incur opportunity costs. **DOK 2**

SS-EP-3.4.3

Students will define interdependence and give examples of how people in our communities, states, nation and world depend on each other for goods and services.

SS-04-3.4.3

Students will define interdependence and give examples of how people in our communities, states, nation and world depend on each other for goods and services.

SS-05-3.4.3

Students will define interdependence and give examples of how people in our communities, states, nation and world depend on each other for goods and services.

SS-EP-4.1.3

Students will describe how different factors (e.g. rivers, mountains) influence where human activities are located in the community.

SS-EP-4.3.1

Students will describe patterns of human settlement in places and regions on the Earth's surface.

SS-EP-4.4.1

Students will describe ways people adapt to/modify the physical environment to meet their basic needs (food, shelter, clothing). **DOK 1**

SS-EP-4.4.2

Students will describe how the physical environment can both promote and restrict human activities.

SS-05-4.4.3

Students will describe how individuals/groups may have different perspectives about the use of land (e.g., farming, industrial, residential, recreational).

SS-EP-5.1.1

Students will use a variety of primary and secondary sources (e.g., artifacts, diaries, timelines) to interpret the past.

AH-EP-3.1.1

Students will experience music created for a variety of purposes.

Purposes of music (different roles of music)

- Ceremonial - music created or performed for rituals or celebrations (e.g., patriotic music, music for worship)
- Recreational - music for entertainment (e.g., music for play such as game songs, music for dances and social events, music for physical activities, music as a hobby)
- Artistic Expression - music created with the intent to express or communicate one's emotions, feelings, ideas, experience (e.g., music created and performed in a concert setting for an audience)

AH-04-3.1.1

Students will identify how music fulfills a variety of purposes. **DOK 2**

Purposes of music (different roles of music)

- Ceremonial - music created or performed for rituals or celebrations (e.g., patriotic music, music for worship)
- Recreational - music for entertainment (e.g., music for play such as game songs, music for dances and social events, music for physical activities, music as a hobby)
- Artistic Expression - music created with the intent to express or communicate one's emotions, feelings, ideas, experience (e.g., music created and performed in a concert setting for an audience)

AH-05-3.1.1

Students will describe or explain how music fulfills a variety of purposes. **DOK 2**

Purposes of music (different roles of music)

- Ceremonial - music created or performed for rituals or celebrations (e.g., patriotic music, music for worship)
- Recreational - music for entertainment (e.g., music for play such as game songs, music for dances and social events, music for physical activities, music as a hobby)
- Artistic Expression - music created with the intent to express or communicate one's emotions, feelings, ideas, experience (e.g., music created and performed in a concert setting for an audience)

AH-EP-3.2.1

Students will experience dance created for a variety of purposes.

Purposes of dance: (different roles of dance)

- Ceremonial - dances created or performed for rituals or celebrations (e.g., dances of Native Americans and West Africans to celebrate life events such as harvest, ritual dances associated with worship)
- Recreational - dancing for entertainment, to support recreational activities (e.g., ballroom, line dancing, aerobic dance, dance as a hobby)
- Artistic Expression - dance created with the intent to express or communicate emotion, feelings, ideas, (e.g., ballet, tap dance, modern dance, dance created and performed in a concert and/or theatrical setting for an audience)

AH-04-3.2.1

Students will identify how dance fulfills a variety of purposes. **DOK 2**

Purposes of dance: (different roles of dance)

- Ceremonial - dances created or performed for rituals or celebrations (e.g., dances of Native Americans and West Africans to celebrate life events such as harvest, ritual dances associated with worship)
- Recreational - dancing for entertainment, to support recreational activities (e.g., ballroom, line dancing, aerobic dance, dance as a hobby)
- Artistic Expression - dance created with the intent to express or communicate emotion, feelings, ideas, (e.g., ballet, tap dance, modern dance, dance created and performed in a concert and/or theatrical setting for an audience)

AH-05-3.2.1

Students will describe or explain how dance fulfills a variety of purposes. **DOK 2**

Purposes of dance: (different roles of dance)

- Ceremonial - dances created or performed for rituals or celebrations (e.g., dances of Native Americans and West Africans to celebrate life events such as harvest, ritual dances associated with worship)
- Recreational - dancing for entertainment, to support recreational activities (e.g., ballroom, line dancing, aerobic dance, dance as a hobby)
- Artistic Expression - dance created with the intent to express or communicate emotion, feelings, ideas, (e.g., ballet, tap dance, modern dance, dance created and performed in a concert and/or theatrical setting for an audience)

AH-EP-3.4.1

Students will experience visual art works created for a variety of purposes.

Purposes of art: (different roles of art)

- Ceremonial - ritual, celebration, artworks created to support worship ceremonies (e.g., ceremonial masks)
- Artistic expression - artwork to express or communicate emotions, ideas, feelings (e.g., for self-expression, to decorate or beautify objects) Narrative - artworks that tell stories, describe and illustrate experiences, or communicate ideas or information, art to document important or historical events (e.g., Native American totem poles, cave and wall paintings)
- Functional - artistic objects used in everyday life (e.g., pottery, quilts, baskets)

AH-04-3.4.1

Students will identify how art fulfills a variety of purposes. **DOK 2**

Purposes of art: (different roles of art)

- Ceremonial - ritual, celebration, artworks created to support worship ceremonies (e.g., ceremonial masks)
- Artistic expression - artwork to express or communicate emotions, ideas, feelings (e.g., for self-expression, to decorate or beautify objects)
- Narrative - artworks that tell stories, describe and illustrate experiences, or communicate ideas or information, art to document important or historical events (e.g., Native American totem poles, cave and wall paintings)
- Functional - artistic objects used in everyday life (e.g., pottery, quilts, baskets.)

AH-05-3.4.1

Students will describe or explain how art fulfills a variety of purposes. **DOK 2**

Purposes of art: (different roles of art)

- Ceremonial - ritual, celebration, artworks created to support worship ceremonies (e.g., ceremonial masks)
- Artistic expression - artwork to express or communicate emotions, ideas, feelings (e.g., for self-expression, to decorate or beautify objects)
- Narrative - artworks that tell stories, describe and illustrate experiences, or communicate ideas or information, art to document important or historical events (e.g., Native American totem poles, cave and wall paintings)
- Functional - artistic objects used in everyday life (e.g., pottery, quilts, baskets.)

CORROBOREE: MIDDLE SCHOOL LEVEL

SS-06-2.1.1

Students will explain how elements of culture (e.g., language, the arts, customs, beliefs, literature) define specific groups in the global world of the present day and may result in unique perspectives. **DOK 2**

SS-06-2.2.1

Students will compare how cultures (present day) develop social institutions (family, religion, education, government, economy) to respond to human needs, structure society and influence behavior.

SS-06-2.3.1

Students will explain how conflict and competition (e.g., political, economic, religious, ethnic) occur among individuals and groups in the present day. **DOK 2**

SS-06-4.2.1

Students will describe how regions in the present day are made distinctive by human characteristics (e.g., dams, roads, urban centers) and physical characteristics (e.g., mountains, bodies of water, valleys) that create advantages and disadvantages for human activities (e.g., exploration, migration, trade, settlement, development). **DOK 2**

SS-06-4.3.1

Students will describe patterns of human settlement in the present day and explain how these patterns are influenced by human needs. **DOK 2**

SS-06-4.3.2

Students will explain why and give examples of how human populations may change and/or migrate because of factors such as war, famine, disease, economic opportunity and technology in the present day. **DOK 3**

SS-06-4.4.2

Students will describe ways in which the physical environment (e.g., natural resources, physical geography, natural disasters) both promotes and limits human activities (e.g., exploration, migration, trade, settlement, development) in the present day. **DOK 2**

SS-06-4.4.3

Students will explain how the natural resources of a place or region impact its political, social and economic development in the present day.

SS-06-4.4.4

Students will explain how individual and group perspectives impact the use of natural resources (e.g., urban development, recycling) in the present day.

AH-06-3.1.1

Students will identify or explain how music fulfills a variety of purposes. **DOK 2**

Purposes of music: (different roles of music)

- Ceremonial - music created or performed for rituals or celebrations (e.g., patriotic music, music for worship)
- Recreational - music for entertainment (e.g., music for play such as game songs, music for dances and social events, music for physical activities, music as a hobby)
- Artistic Expression - music created with the intent to express or communicate one's emotions, feelings, ideas, experience (e.g., music created and performed in a concert setting for an audience)

AH-07-3.1.1

Students will identify or explain how music fulfills a variety of purposes. **DOK 2**

Purposes of music: (different roles of music)

- Ceremonial - music created or performed for rituals or celebrations (e.g., patriotic music, music for worship)
- Recreational - music for entertainment (e.g., music for play such as game songs, music for dances and social events, music for physical activities, music as a hobby)
- Artistic Expression - music created with the intent to express or communicate one's emotions, feelings, ideas, experience (e.g., music created and performed in a concert setting for an audience)

AH-08-3.1.1

Students will compare or explain how music fulfills a variety of purposes. **DOK 2**

Purposes of music: (different roles of music)

- Ceremonial - music created or performed for rituals or celebrations (e.g., patriotic music, music for worship)
- Recreational - music for entertainment (e.g., music for play such as game songs, music for dances and social events, music for physical activities, music as a hobby)
- Artistic Expression - music created with the intent to express or communicate one's emotions, feelings, ideas, experience (e.g., music created and performed in a concert setting for an audience)

AH-06-3.2.1 Students will identify or explain how dance fulfills a variety of purposes. **DOK 2**

Purposes of Dance:

- Ceremonial - dances created or performed for rituals or celebrations (e.g., dances of Native Americans and West Africans to celebrate life events such as harvest, ritual dances associated with worship)
- Recreational - dancing for entertainment, to support recreational activities (e.g., ballroom, line dancing, aerobic dance, dance as a hobby)
- Artistic expression - dance created with the intent to express or communicate emotion, feelings, ideas (e.g., ballet, tap dance, modern dance, dance created and performed in a concert and/or theatrical setting for an audience)

AH-07-3.2.1

Students will identify or explain how dance fulfills a variety of purposes. **DOK 2**

- Ceremonial - dances created or performed for rituals or celebrations (e.g., dances of Native Americans and West Africans to celebrate life events such as harvest, ritual dances associated with worship)
- Recreational - dancing for entertainment, to support recreational activities (e.g., ballroom, line dancing, aerobic dance, dance as a hobby)
- Artistic expression - dance created with the intent to express or communicate emotion, feelings, ideas (e.g., ballet, tap dance, modern dance, dance created and performed in a concert and/or theatrical setting for an audience)

AH-08-3.2.1

Students will compare or explain how dance fulfills a variety of purposes. **DOK 2**

- Ceremonial - dances created or performed for rituals or celebrations (e.g., dances of Native Americans and West Africans to celebrate life events such as harvest, ritual dances associated with worship)
- Recreational - dancing for entertainment, to support recreational activities (e.g., ballroom, line dancing, aerobic dance, dance as a hobby)
- Artistic expression - dance created with the intent to express or communicate emotion, feelings, ideas (e.g., ballet, tap dance, modern dance, dance created and performed in a concert and/or theatrical setting for an audience)

AH-06-3.4.1

Students will identify or explain how art fulfills a variety of purposes. **DOK 2**

Purposes of Art: (different roles of art)

- Ceremonial - ritual, celebration, artworks created to support worship ceremonies
- Artistic expression - artwork to express or communicate emotions, ideas, feelings (e.g., for self-expression, to decorate or beautify objects)
- Narrative - artworks that tell stories, describe and illustrate experiences, or communicate ideas or information, art to document important or historical events
- Functional - artistic objects used in everyday life
- Persuasive - artworks that promote ideas, philosophies, or products (e.g., advertising, marketing, propaganda, ideology, etc.)

AH-07-3.4.1

Students will identify or explain how art fulfills a variety of purposes. **DOK 2**

Purposes of Art: (different roles of art)

- Ceremonial - ritual, celebration, artworks created to support worship ceremonies
- Artistic expression - artwork to express or communicate emotions, ideas, feelings (e.g., for self-expression, to decorate or beautify objects)
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- Functional - artistic objects used in everyday life
- Persuasive - artworks that promote ideas, philosophies, or products (e.g., advertising, marketing, propaganda, ideology, etc.)

AH-08-3.4.1

Students will compare or explain how art fulfills a variety of purposes. **DOK 2**

Purposes of Art: (different roles of art)

- Ceremonial - ritual, celebration, artworks created to support worship ceremonies
- Artistic expression - artwork to express or communicate emotions, ideas, feelings (e.g., for self-expression, to decorate or beautify objects)
- Narrative - artworks that tell stories, describe and illustrate experiences, or communicate ideas or information, art to document important or historical events
- Functional - artistic objects used in everyday life
- Persuasive - artworks that promote ideas, philosophies, or products (e.g., advertising, marketing, propaganda, ideology, etc.)

AH-06-4.1.4

Students will use a variety of sound sources to create and perform music.

AH-07-4.1.4

Students will use a variety of musical sound sources to create and perform music.

AH-08-4.1.4

Students will use a variety of sound sources to create and perform music.

AH-06-4.33

Students will engage in dramatic activities that reflect historical times and cultures.

AH-07-4.3.3

Students will engage in dramatic activities that reflect historical times and cultures.

AH-08-4.3.3

Students will engage in dramatic activities that reflect historical times and cultures.

CORROBOREE: HIGH SCHOOL LEVEL

SS-HS-4.2.1

Students will interpret how places and regions serve as meaningful symbols for individuals and societies (e.g., Jerusalem, Vietnam Memorial, Ellis Island, the Appalachian region).

SS-HS-4.2.2

Students will explain how physical (e.g., climate, mountains, rivers) and human characteristics (e.g., interstate highways, urban centers, workforce) of regions create advantages and disadvantages for human activities in a specific place. **DOK 2**

SS-HS-4.2.3

Students will explain how people can develop stereotypes about places and regions (e.g., all cities are dangerous and dirty; rural areas are poor).

SS-HS-4.4.1

Students will explain how humans develop strategies (e.g., transportation, communication, technology) to overcome limits of their physical environment.

AH-HS-3.1.1

Students will explain how music fulfills a variety of purposes. **DOK 2**

Purposes of music: (different roles of music)

- Ceremonial - music created or performed for rituals or celebrations (e.g., patriotic music, music for worship)
- Recreational - music for entertainment (e.g., music for play such as game songs, music for dances and social events, music for physical activities, music as a hobby)
- Artistic expression - music created with the intent to express or communicate one's emotions, feelings, ideas, experience (e.g., music created and performed in a concert setting for an audience)

AH-HS-3.2.1

Students will explain how dance fulfills a variety of purposes. **DOK 2**

- Ceremonial - dances created or performed for rituals or celebrations (e.g., dances of Native Americans and West Africans to celebrate life events such as harvest, ritual dances associated with worship)
- Recreational - dancing for entertainment, to support recreational activities (e.g., ballroom, line dancing, aerobic dance, dance as a hobby)
- Artistic expression - dance created with the intent to express or communicate emotion, feelings, ideas (e.g., ballet, tap dance, modern dance, dance created and performed in a concert and/or theatrical setting for an audience)

AH-HS-4.2.4

Students will perform social, recreational and artistic dances from various historical periods and cultures.

SCALES AND TAILS

This program focuses on the amazing world of reptiles: their characteristics, body structures, special adaptations, and life cycles. Their interaction with man and their niche in the ecosystem is also explored.

SCALES AND TAILS-ELEMENTARY LEVEL

SC-EP-3.4.1

Students will explain the basic needs of organisms. Organisms have basic needs. For example, animals need air, water and food; plants need air, water, nutrients and light. Organisms can survive only in environments in which their needs can be met. **DOK 2**

SC-04-3.4.1

Students will:

- compare the different structures and functions of plants and animals that contribute to the growth, survival and reproduction of the organisms;
- make inferences about the relationship between structure and function in organisms.

Each plant or animal has structures that serve different functions in growth, survival and reproduction. For example, humans have distinct body structures for walking, holding, seeing and talking. Evidence about the relationship between structure and function should be used to make inferences and draw conclusions. **DOK 3**

SC-05-3.4.1

Students will describe and compare living systems to understand the complementary nature of structure and function. Observations and comparisons of living systems at all levels of organization illustrate the complementary nature of structure and function. Important levels of organization for structure and function include cells, tissues, organs, organ systems, organisms (e.g., bacteria, protists, fungi, plants, animals), and ecosystems. Examining the relationship between structure and function provides a basis for comparisons and classification schemes. **DOK 2**

SC-EP-3.4.2

Students will understand that things in the environment are classified as living, nonliving and once living. Living things differ from nonliving things. Organisms are classified into groups by using various characteristics (e.g., body coverings, body structures).

SC-04-3.4.2

Students will understand that things in the environment are classified as living, nonliving and once living. Living things differ from nonliving things. Organisms are classified into groups by using various characteristics (e.g., body coverings, body structures).

SC-EP-3.4.3

Students will describe the basic structures and related functions of plants and animals that contribute to growth, reproduction and survival. Each plant or animal has observable structures that serve different functions in growth, survival and reproduction. For example, humans have distinct body structures for walking, holding, seeing and talking. These observable structures should be explored to sort, classify, compare and describe organisms. **DOK 2**

SC-04-3.4.3

Students will compare a variety of life cycles of plants and animals in order to classify and make inferences about an organism. Plants and animals have life cycles that include the beginning of life, growth and development, reproduction and death. The details of a life cycle are different for different organisms. Models of organisms' life cycles should be used to classify and make inferences about an organism. **DOK 3**

SC-EP-3.4.4

Students will describe a variety of plant and animal life cycles to understand patterns of the growth, development, reproduction and death of an organism. Plants and animals have life cycles that include the beginning of life, growth and development, reproduction and death. The details of a life cycle are different for different organisms. Observations of different life cycles should be made in order to identify patterns and recognize similarities and differences. **DOK 2**

SC-04-3.4.4

Students will identify some characteristics of organisms that are inherited from the parents and others that are learned from interactions with the environment. Observations of plants and animals yield the conclusion that organisms closely resemble their parents at some time in their life cycle. Some characteristics (e.g., the color of flowers, the number of appendages) are passed to offspring. Other characteristics are learned from interactions with the environment, such as the ability to ride a bicycle, and these cannot be passed on to the next generation. Explorations related to inherited versus learned characteristics should offer opportunities to collect data and draw conclusions about various groups of organisms. **DOK 2**

SC-05-3.5.1

Students will describe cause and effect relationships between enhanced survival/reproductive success and particular biological adaptations (e.g., changes in structures, behaviors, and/or physiology) to generalize about the diversity of populations of organisms. Biological change over time accounts for the diversity of populations developed through gradual processes over many generations. Examining cause and effect relationships between enhanced survival/reproductive success and biological adaptations (e.g., changes in structures, behaviors, and/or physiology), based on evidence gathered, creates the basis for explaining diversity. **DOK 2**

SC-05-3.5.2

Students will understand that all organisms must be able to obtain and use resources, grow, reproduce, and maintain stable internal conditions while living in a constantly changing external environment.

SC-EP-4.6.1

Students will describe basic relationships of plants and animals in an ecosystem (food chains). Plants make their own food. All animals depend on plants. Some animals eat plants for food. Other animals eat animals that eat the plants. Basic relationships and connections between organisms in food chains can be used to discover patterns within ecosystems. **DOK 2**

SC-04-4.6.1

Students will analyze patterns and make generalizations about the basic relationships of plants and animals in an ecosystem (food chain). Plants make their own food. All animals depend on plants. Some animals eat plants for food. Other animals eat animals that eat the plants. Basic relationships and connections between organisms in food chains, including the flow of energy, can be used to discover patterns within ecosystems. **DOK 2**

SC-EP-4.7.1

Students will describe the cause and effect relationships existing between organisms and their environments. The world has many different environments. Organisms require an environment in which their needs can be met. When the environment changes some plants and animals survive and reproduce and others die or move to new locations. **DOK 2**

SC-04-4.7.1

Students will make predictions and/or inferences based on patterns of evidence related to the survival and reproductive success of organisms in particular environments. The world has many different environments. Distinct environments support the lives of different types of organisms. When the environment changes some plants and animals survive and reproduce and others die or move to new locations. Examples of environmental changes resulting in either increase or decrease in numbers of a particular organism should be explored in order to discover patterns and resulting cause and effect relationships between organisms and their environments (e.g., structures and behaviors that make an organism suited to a particular environment). Connections and conclusions should be made based on the data. **DOK 3**

SC-05-4.7.1

Students will:

- describe and categorize populations of organisms according to the function they serve in an ecosystem (e.g., producers, consumers, decomposers);
- draw conclusions about the effects of changes to populations in an ecosystem.

Populations of organisms can be categorized by the function they serve in an ecosystem. Plants and some microorganisms are producers because they make their own food. All animals, including humans, are consumers, and

obtain their food by eating other organisms. Decomposers, primarily bacteria and fungi, are consumers that use waste materials and dead organisms for food. Food webs identify the relationships among producers, consumers and decomposers in an ecosystem. Using data gained from observing interacting components within an ecosystem, the effects of changes can be predicted. **DOK 3**

SC-04-4.7.2

Students will:

- describe human interactions in the environment where they live;
- classify the interactions as beneficial or harmful to the environment using data/evidence to support conclusions.

All organisms, including humans, cause changes in the environment where they live. Some of these changes are detrimental to the organism or to other organisms; other changes are beneficial (e.g., dams benefit some aquatic organisms but are detrimental to others). By evaluating the consequences of change using cause and effect relationships, solutions to real life situations/dilemmas can be proposed. **DOK 3**

SC-05-4.7.2

Students will understand that a population consists of all individuals of a species that occur together at a given place and time. All populations living together and the physical factors with which they interact compose an ecosystem.

SCALES AND TAILS-MIDDLE SCHOOL LEVEL

SC-06-3.4.1

Students will describe the relationship between cells, tissues and organs in order to explain their function in multicellular organisms. Specialized cells perform specialized functions in multicellular organisms. Groups of specialized cells cooperate to form tissues. Different tissues are, in turn, grouped together to form larger functional units called organs. Examination of cells, tissues and organs reveals that each type has a distinct structure and set of functions that serve the organism. **DOK 3**

SC-07-3.4.1

Students will:

- describe the role of genes/chromosomes in the passing of information from one generation to another (heredity);
- compare inherited and learned traits.

Every organism requires a set of instructions for specifying its traits. This information is contained in genes located in the chromosomes of each cell that can be illustrated through the use of models. Heredity is the passage of these instructions from one generation to another and should be distinguished from learned traits. **DOK 2**

SC-06-3.4.2

Students will make inferences about the factors influencing behavior based on data/evidence of various organism's behaviors. Behavior is one kind of response an organism may make to an internal or environmental stimulus. Observations of organisms, data collection/analysis, support generalizations/conclusions that a behavioral response is a set of actions determined in part by heredity and in part from experience. A behavioral response requires coordination and communication at many levels including cells, organ systems and organisms. **DOK 2**

SC-08-3.4.3

Students will form or justify conclusions as to whether a response is innate or learned using data/evidence on behavioral responses to internal and external stimuli. Behavioral responses to internal changes and external stimuli can be innate or learned. Responses to external stimuli can result from interactions with the organism's own species or other species, as well as environmental changes. **DOK 3**

SC-08-3.4.4

Students will describe and explain patterns found within groups of organisms in order to make biological classifications of those organisms. Observations and patterns found within groups of organisms allow for biological classifications based on how organisms are related. **DOK 2**

SC-06-3.5.1

Students will explain that biological change over time accounts for the diversity of species developed through gradual processes over many generations. Biological adaptations include changes in structures, behaviors, or physiology that enhance survival and reproductive success in a particular environment. **DOK 2**

SC-06-3.5.2

Students will understand that regulation of an organism's internal environment involves sensing the internal environment and changing physiological activities to keep conditions within the range required to survive. Maintaining a stable internal environment is essential for an organism's survival.

SC-06-4.7.1

Students will describe the consequences of change in one or more abiotic factors on a population within an ecosystem. The number of organisms an ecosystem can support depends on the resources available and abiotic factors (e.g., quantity of light and water, range of temperatures, soil composition). **DOK 2**

SC-07-4.7.1

Students will compare abiotic and biotic factors in an ecosystem in order to explain consequences of change in one or more factors. The number of organisms an ecosystem can support depends on the resources available and abiotic factors (e.g., quantity of light and water, range of temperatures, soil composition). Given adequate biotic and abiotic resources and no diseases or predators, populations (including humans) increase at rapid rates. Lack of resources and other factors, such as predation and climate, limit the growth of populations in specific niches in the ecosystem. **DOK 3**

SC-08-4.7.1

Students will describe the interrelationships and interdependencies within an ecosystem and predict the effects of change on one or more components within an ecosystem. Organisms both cooperate and compete in ecosystems. Often changes in one component of an ecosystem will have effects on the entire system that are difficult to predict. The interrelationships and interdependencies of these organisms may generate ecosystems that are stable for hundreds or thousands of years. **DOK 3**

SCALES AND TAILS-HIGH SCHOOL LEVEL

SC-HS-3.4.7

Students will:

- classify organisms into groups based on similarities;
- infer relationships based on internal and external structures and chemical processes.

Biological classifications are based on how organisms are related. Organisms are classified into a hierarchy of groups and subgroups based on similarities that reflect their relationships. Species is the most fundamental unit of classification. Different species are classified by the comparison and analysis of their internal and external structures and the similarity of their chemical processes. **DOK 2**

SC-HS-3.4.8

Students will understand that multicellular animals have nervous systems that generate behavior. Nerve cells communicate with each other by secreting specific molecules. Specialized cells in sense organs detect light, sound and specific chemicals enabling animals to monitor what is going on in the world around them.

SC-HS-3.5.2

Students will:

- predict the success of patterns of adaptive behaviors based on evidence/data;
- justify explanations of organism survival based on scientific understandings of behavior.

The broad patterns of behavior exhibited by organisms have changed over time through natural selection to ensure reproductive success. Organisms often live in unpredictable environments, so their behavioral responses must be flexible enough to deal with uncertainty and change. Behaviors often have an adaptive logic. **DOK 3**

SC-HS-4.7.1

Students will:

- analyze relationships and interactions among organisms in ecosystems;

- predict the effects on other organisms of changes to one or more components of the ecosystem.

Organisms both cooperate and compete in ecosystems. Often changes in one component of an ecosystem will have effects on the entire system that are difficult to predict. The interrelationships and interdependencies of these organisms may generate ecosystems that are stable for hundreds or thousands of years. **DOK 3**

SC-HS-4.7.2

Students will:

- evaluate proposed solutions from multiple perspectives to environmental problems caused by human interaction;
- justify positions using evidence/data.

Human beings live within the world's ecosystems. Human activities can deliberately or inadvertently alter the dynamics in ecosystems. These activities can threaten current and future global stability and, if not addressed, ecosystems can be irreversibly affected. **DOK 3**

SC-HS-4.7.5

Students will:

- predict the consequences of changes in resources to a population;
- select or defend solutions to real-world problems of population control.

Living organisms have the capacity to produce populations of infinite size. However, behaviors, environments and resources influence the size of populations. Models (e.g., mathematical, physical, conceptual) can be used to make predictions about changes in the size or rate of growth of a population. **DOK 3**

TARABA STATION

This program focuses on the amazing world of introduced species and their on the natural environment that they inhabit.

TARABA STATION: ELEMENTARY LEVEL

SS-EP-4.1.3

Students will describe how different factors (e.g. rivers, mountains) influence where human activities are located in the community

SS-EP-4.2.1

Students will describe places on Earth's surface by their physical characteristics (e.g., climate, landforms, bodies of water).

SS-EP-4.3.1

Students will describe patterns of human settlement in places and regions on the Earth's surface.

SS-EP-4.4.1

Students will describe ways people adapt to/modify the physical environment to meet their basic needs (food, shelter, clothing). **DOK 1**

SS-EP-4.4.2

Students will describe how the physical environment can both promote and restrict human activities.

SC-EP-3.4.1

Students will explain the basic needs of organisms. Organisms have basic needs. For example, animals need air, water and food; plants need air, water, nutrients and light. Organisms can survive only in environments in which their needs can be met. **DOK 2**

SC-04-3.4.1

Students will:

- compare the different structures and functions of plants and animals that contribute to the growth, survival and reproduction of the organisms;
- make inferences about the relationship between structure and function in organisms.

Each plant or animal has structures that serve different functions in growth, survival and reproduction. For example, humans have distinct body structures for walking, holding, seeing and talking. Evidence about the relationship between structure and function should be used to make inferences and draw conclusions. **DOK 3**

SC-05-3.4.1

Students will describe and compare living systems to understand the complementary nature of structure and function. Observations and comparisons of living systems at all levels of organization illustrate the complementary nature of structure and function. Important levels of organization for structure and function include cells, tissues, organs, organ systems, organisms (e.g., bacteria, protists, fungi, plants, animals), and ecosystems. Examining the relationship between structure and function provides a basis for comparisons and classification schemes. **DOK 2**

SC-05-3.5.2

Students will understand that all organisms must be able to obtain and use resources, grow, reproduce, and maintain stable internal conditions while living in a constantly changing external environment.

SC-04-4.7.2

Students will:

- describe human interactions in the environment where they live;
- classify the interactions as beneficial or harmful to the environment using data/evidence to support conclusions.

All organisms, including humans, cause changes in the environment where they live. Some of these changes are detrimental to the organism or to other organisms; other changes are beneficial (e.g., dams benefit some aquatic organisms but are detrimental to

others). By evaluating the consequences of change using cause and effect relationships, solutions to real life situations/dilemmas can be proposed. **DOK 3**

TARABA STATION- MIDDLE SCHOOL LEVEL

SS-06-4.1.2

Students will describe how different factors (e.g., rivers, mountains, plains) affect where human activities are located in the present day.

SS-06-4.2.1

Students will describe how regions in the present day are made distinctive by human characteristics (e.g., dams, roads, urban centers) and physical characteristics (e.g., mountains, bodies of water, valleys) that create advantages and disadvantages for human activities (e.g., exploration, migration, trade, settlement, development). **DOK 2**

SS-06-4.2.2

Students will describe and give examples of how places and regions in the present day change over time as technologies, resources and knowledge become available. **DOK 2**

SS-06-4.3.1

Students will describe patterns of human settlement in the present day and explain how these patterns are influenced by human needs. **DOK 2**

SS-06-4.3.2

Students will explain why and give examples of how human populations may change and/or migrate because of factors such as war, famine, disease, economic opportunity and technology in the present day. **DOK 3**

SS-06-4.4.1

Students will explain how technology in the present day assists human modification (e.g., irrigation, clearing land, building roads) of the physical environment in regions. **DOK 2**

SS-06-4.4.2

Students will describe ways in which the physical environment (e.g., natural resources, physical geography, natural disasters) both promotes and limits human activities (e.g., exploration, migration, trade, settlement, development) in the present day. **DOK 2**

SS-06-4.4.3

Students will explain how the natural resources of a place or region impact its political, social and economic development in the present day.

SS-06-4.4.4

Students will explain how individual and group perspectives impact the use of natural resources (e.g., urban development, recycling) in the present day.

SC-07-3.4.1

Students will:

- describe the role of genes/chromosomes in the passing of information from one generation to another (heredity);
- compare inherited and learned traits.

Every organism requires a set of instructions for specifying its traits. This information is contained in genes located in the chromosomes of each cell that can be illustrated through the use of models. Heredity is the passage of these instructions from one generation to another and should be distinguished from learned traits. **DOK 2**

SC-06-3.4.2

Students will make inferences about the factors influencing behavior based on data/evidence of various organism's behaviors. Behavior is one kind of response an organism may make to an internal or environmental stimulus. Observations of organisms, data collection/analysis, support generalizations/conclusions that a behavioral response

is a set of actions determined in part by heredity and in part from experience. A behavioral response requires coordination and communication at many levels including cells, organ systems and organisms. **DOK 2**

SC-08-3.4.3

Students will form or justify conclusions as to whether a response is innate or learned using data/evidence on behavioral responses to internal and external stimuli. Behavioral responses to internal changes and external stimuli can be innate or learned. Responses to external stimuli can result from interactions with the organism's own species or other species, as well as environmental changes. **DOK 3**

SC-06-3.5.1

Students will explain that biological change over time accounts for the diversity of species developed through gradual processes over many generations. Biological adaptations include changes in structures, behaviors, or physiology that enhance survival and reproductive success in a particular environment. **DOK 2**

SC-06-3.5.2

Students will understand that regulation of an organism's internal environment involves sensing the internal environment and changing physiological activities to keep conditions within the range required to survive. Maintaining a stable internal environment is essential for an organism's survival.

SC-06-4.7.1

Students will describe the consequences of change in one or more abiotic factors on a population within an ecosystem. The number of organisms an ecosystem can support depends on the resources available and abiotic factors (e.g., quantity of light and water, range of temperatures, soil composition). **DOK 2**

SC-07-4.7.1

Students will compare abiotic and biotic factors in an ecosystem in order to explain consequences of change in one or more factors. The number of organisms an ecosystem can support depends on the resources available and abiotic factors (e.g., quantity of light and water, range of temperatures, soil composition). Given adequate biotic and abiotic resources and no diseases or predators, populations (including humans) increase at rapid rates. Lack of resources and other factors, such as predation and climate, limit the growth of populations in specific niches in the ecosystem. **DOK 3**

SC-08-4.7.1

Students will describe the interrelationships and interdependencies within an ecosystem and predict the effects of change on one or more components within an ecosystem. Organisms both cooperate and compete in ecosystems. Often changes in one component of an ecosystem will have effects on the entire system that are difficult to predict. The interrelationships and interdependencies of these organisms may generate ecosystems that are stable for hundreds or thousands of years. **DOK 3**

TARABA STATION- HIGH SCHOOL LEVEL

SS-HS-4.2.2

Students will explain how physical (e.g., climate, mountains, rivers) and human characteristics (e.g., interstate highways, urban centers, workforce) of regions create advantages and disadvantages for human activities in a specific place. **DOK 2**

SS-HS-4.4.1

Students will explain how humans develop strategies (e.g., transportation, communication, technology) to overcome limits of their physical environment.

SS-HS-4.4.3

Students will explain how group and individual perspectives impact the use of natural resources (e.g., mineral extraction, land reclamation).

SC-HS-3.5.1

Students will:

- predict the impact on species of changes to 1) the potential for a species to increase its numbers, (2) the genetic variability of offspring due to mutation and recombination of genes, (3) a finite supply of the resources required for life, or (4) natural selection;
- propose solutions to real-world problems of endangered and extinct species.

Species change over time. Biological change over time is the consequence of the interactions of (1) the potential for a species to increase its numbers, (2) the genetic variability of offspring due to mutation and recombination of genes, (3) a finite supply of the resources required for life and (4) natural selection. The consequences of change over time provide a scientific explanation for the fossil record of ancient life forms and for the striking molecular similarities observed among the diverse species of living organisms. Changes in DNA (mutations) occur spontaneously at low rates. Some of these changes make no difference to the organism, whereas others can change cells and organisms. Only mutations in germ cells have the potential to create the variation that changes an organism's future offspring.

DOK 3

SC-HS-3.5.2

Students will:

- predict the success of patterns of adaptive behaviors based on evidence/data;
- justify explanations of organism survival based on scientific understandings of behavior.

The broad patterns of behavior exhibited by organisms have changed over time through natural selection to ensure reproductive success. Organisms often live in unpredictable environments, so their behavioral responses must be flexible enough to deal with uncertainty and change. Behaviors often have an adaptive logic. **DOK 3**

SC-HS-4.7.1

Students will:

- analyze relationships and interactions among organisms in ecosystems;
- predict the effects on other organisms of changes to one or more components of the ecosystem.

Organisms both cooperate and compete in ecosystems. Often changes in one component of an ecosystem will have effects on the entire system that are difficult to predict. The interrelationships and interdependencies of these organisms may generate ecosystems that are stable for hundreds or thousands of years. **DOK 3**

SC-HS-4.7.2

Students will:

- evaluate proposed solutions from multiple perspectives to environmental problems caused by human interaction;
- justify positions using evidence/data.

Human beings live within the world's ecosystems. Human activities can deliberately or inadvertently alter the dynamics in ecosystems. These activities can threaten current and future global stability and, if not addressed, ecosystems can be irreversibly affected. **DOK 3**

SC-HS-4.7.5

Students will:

- predict the consequences of changes in resources to a population;
- select or defend solutions to real-world problems of population control.

Living organisms have the capacity to produce populations of infinite size. However, behaviors, environments and resources influence the size of populations. Models (e.g., mathematical, physical, conceptual) can be used to make predictions about changes in the size or rate of growth of a population. **DOK 3.**