4ᵗʰ Grade Science State Science Core Scope and Sequence and "I can" Statements (2002)

- The scope is the standards with their objectives and indicators.
- The sequence is any order you want to teach the standards, however, teach each standard in the order they are shown.
- The "I can" statements are the indicators under each objective.

Science Benchmark

Matter on Earth cycles from one form to another. The cycling of matter on Earth requires energy. The cycling of water is an example of this process. The sun is the source of energy for the water cycle. Water changes state as it cycles between the atmosphere, land, and bodies of water on Earth.

STANDARD I: Students will understand that water changes state as it moves through the water cycle.

Objective 1: Describe the relationship between heat energy, evaporation and condensation of water on Earth.
a.   I can identify the relative amount and kind of water found in various locations on Earth (e.g., oceans have most of the water, glaciers and snowfields contain most fresh water).
b.   I can identify the sun as the source of energy that evaporates water from the surface of Earth.
c.   I can compare the processes of evaporation and condensation of water.
d.   I can investigate and record temperature data to show the effects of heat energy on changing the states of water.

Objective 2: Describe the water cycle.
a.   I can locate examples of evaporation and condensation in the water cycle (e.g., water evaporates when heated and clouds or dew forms when vapor is cooled).
b.   I can describe the processes of evaporation, condensation, and precipitation as they relate to the water cycle.
c.   I can identify locations that hold water as it passes through the water cycle (e.g., oceans, atmosphere, fresh surface water, snow, ice, and ground water).
d.   I can construct a model or diagram to show how water continuously moves through the water cycle over time.
e.   I can describe how the water cycle relates to the water supply in your community.

Science language students should use:	vapor, precipitation, evaporation, clouds, dew, condensation, temperature, water cycle

Science Benchmark

Weather describes conditions in the atmosphere at a certain place and time. Water, energy from the sun, and wind create a cycle of changing weather. The sun's energy warms the oceans and lands at Earth's surface, creating changes in the atmosphere that cause the weather. The temperature and movement of air can be observed and measured to determine the effect on cloud formation and precipitation. Recording weather observations provides data that can be used to predict future weather conditions and establish patterns over time. Weather affects many aspects of people's lives.

STANDARD II: Students will understand that the elements of weather can be observed, measured, and recorded to make predictions and determine simple weather patterns.

Objective 1: Observe, measure, and record the basic elements of weather.
a.   I can identify basic cloud types (i.e., cumulus, cirrus, stratus clouds).
b.   I can observe, measure, and record data on the basic elements of weather over a period of time (i.e., precipitation, air temperature, wind speed and direction, and air pressure).
c.   I can investigate evidence that air is a substance (e.g., takes up space, moves as wind, temperature can be measured).
d.   I can compare the components of severe weather phenomena to normal weather conditions (e.g., thunderstorm with lightning and high winds compared to rainstorm with rain showers and breezes).

Objective 2: Interpret recorded weather data for simple patterns.
a.   I can observe and record effects of air temperature on precipitation (e.g., below freezing results in snow, above freezing results in rain).
b.   I can graph recorded data to show daily and seasonal patterns in weather.
c.   I can infer relationships between wind and weather change (e.g., windy days often precede changes in the weather; south winds in Utah often precede a cold front coming from the north).

Objective 3: Evaluate weather predictions based upon observational data.
a.   I can identify and use the tools of a meteorologist (e.g., measure rainfall using rain gage, measure air pressure using barometer, measure temperature using a thermometer).
b.   I can describe how weather and forecasts affect people's lives.
c.   I can predict weather and justify prediction with observable evidence.
d.   I can evaluate the accuracy of student and professional weather forecasts.
e.   I can relate weather forecast accuracy to evidence or tools used to make the forecast (e.g., feels like rain vs. barometer is dropping).

Science language students should use:	atmosphere, meteorologist, freezing, cumulus, stratus, cirrus, air pressure, thermometer, air temperature, wind speed, forecast, severe, phenomena, precipitation, seasonal, accuracy, barometer, rain gauge, components

Science Benchmark

> Earth materials include rocks, soils, water, and gases. Rock is composed of minerals. Earth materials change over time from one form to another. These changes require energy. Erosion is the movement of materials and weathering is the breakage of bedrock and larger rocks into smaller rocks and soil materials. Soil is continually being formed from weathered rock and plant remains. Soil contains many living organisms. Plants generally get water and minerals from soil.

STANDARD III: Students will understand the basic properties of rocks, the processes involved in the formation of soils, and the needs of plants provided by soil.

Objective 1: Identify basic properties of minerals and rocks.
a.   I can describe the differences between minerals and rocks.
b.   I can observe rocks using a magnifying glass and draw shapes and colors of the minerals.
c.   I can sort rocks by appearance according to the three basic types: sedimentary, igneous and metamorphic (e.g., sedimentary–rounded-appearing mineral and rock particles that are cemented together, often in layers; igneous–with or without observable crystals that are not in layers or with or without air holes or glasslike; metamorphic –crystals/minerals, often in layers).
d.   I can classify common rocks found in Utah as sedimentary (i.e., sandstone, conglomerate, shale), igneous (i.e., basalt, granite, obsidian, pumice) and metamorphic (i.e., marble, gneiss, schist).

Objective 2: Explain how the processes of weathering and erosion change and move materials that become soil.
a.   I can identify the processes of physical weathering that break down rocks at Earth's surface (i.e., water movement, freezing, plant growth, wind).
b.   I can distinguish between weathering (i.e., wearing down and breaking of rock surfaces) and erosion (i.e., the movement of materials).
c.   I can model erosion of Earth materials and collection of these materials as part of the process that leads to soil (e.g., water moving sand in a playground area and depositing this sand in another area).
d.   I can investigate layers of soil in the local area and predict the sources of the sand and rocks in the soil.

Objective 3: Observe the basic components of soil and relate the components to plant growth.
a.   I can observe and list the components of soil (i.e., minerals, rocks, air, water, living and dead organisms) and distinguish between the living, nonliving, and once living components of soil.
b.   I can diagram or model a soil profile showing topsoil, subsoil, and bedrock, and how the layers differ in composition.
c.   I can relate the components of soils to the growth of plants in soil (e.g., mineral nutrients, water).
d.   I can explain how plants may help control the erosion of soil.
e.   I can research and investigate ways to provide mineral nutrients for plants to grow without soil (e.g., grow plants in wet towels, grow plants in wet gravel, grow plants in water).

Science language students should use:	mineral, weathering, erosion, sedimentary, igneous, metamorphic, topsoil, subsoil, bedrock, organism, freeze, thaw, profile, nonliving, structural support, nutrients

Science Benchmark

Fossils are evidence of living organisms from the past and are usually preserved in sedimentary rocks. A fossil may be an impression left in sediments, the preserved remains of an organism, or a trace mark showing that an organism once existed. Fossils are usually made from the hard parts of an organism because soft parts decay quickly. Fossils provide clues to Earth's history. They provide evidence that can be used to make inferences about past environments. Fossils can be compared to one another, to living organisms, and to organisms that lived long ago.

STANDARD IV: Students will understand how fossils are formed, where they may be found in Utah, and how they can be used to make inferences.

Objective 1: Describe Utah fossils and explain how they were formed.
a. I can identify features of fossils that can be used to compare them to living organisms that are familiar (e.g., shape, size and structure of skeleton, patterns of leaves).
b. I can describe three ways fossils are formed in sedimentary rock (i.e., preserved organisms, mineral replacement of organisms, impressions or tracks).
c. I can research locations where fossils are found in Utah and construct a simple fossil map.

Objective 2: Explain how fossils can be used to make inferences about past life, climate, geology, and environments.
a. I can explain why fossils are usually found in sedimentary rock.
b. Based on the fossils found in various locations, I can infer how Utah environments have changed over time (e.g., trilobite fossils indicate that Millard County was once covered by a large shallow ocean; dinosaur fossils and coal indicate that Emery and Uintah County were once tropical and swampy).
c. I can research information on two scientific explanations for the extinction of dinosaurs and other prehistoric organisms.
d. I can formulate questions that can be answered using information gathered on the extinction of dinosaurs.

Science language students should use:	infer, environments, climate, dinosaur, preserved, extinct, extinction, impression, fossil, prehistoric, mineral, organism, replacement, trilobite, sedimentary, tropical

Science Benchmark

Utah has diverse plant and animal life that is adapted to and interacts in areas that can be described as wetlands, forests, and deserts. The characteristics of the wetlands, forests, and deserts influence which plants and animals survive best there. Living and nonliving things in these areas are classified based on physical features.

STANDARD V: Students will understand the physical characteristics of Utah's wetlands, forests, and deserts and identify common organisms for each environment.

Objective 1: Describe the physical characteristics of Utah's wetlands, forests, and deserts.
a.   I can compare the physical characteristics (e.g., precipitation, temperature, and surface terrain) of Utah's wetlands, forests, and deserts.
b.   I can describe Utah's wetlands (e.g., river, lake, stream, and marsh areas where water is a major feature of the environment) forests (e.g., oak, pine, aspen, juniper areas where trees are a major feature of the environment), and deserts (e.g., areas where the lack of water provided an environment where plants needing little water are a major feature of the environment).
c.   I can locate examples of areas that have characteristics of wetlands, forests, or deserts in Utah.
d.   Based upon information gathered, I can classify areas of Utah that are generally identified as wetlands, forests, or deserts.
e.   I can create models of wetlands, forests, and deserts.

Objective 2: Describe the common plants and animals found in Utah environments and how these organisms have adapted to the environment in which they live.
a.   I can identify common plants and animals that inhabit Utah's forests, wetlands, and deserts.
b.   I can cite examples of physical features that allow particular plants and animals to live in specific environments (e.g., duck has webbed feet, cactus has waxy coating).
c.   I can describe some of the interactions between animals and plants of a given environment (e.g., woodpecker eats insects that live on trees of a forest, brine shrimp of the Great Salt Lake eat algae and birds feed on brine shrimp).
d.   I can identify the effect elevation has on types of plants and animals that live in a specific wetland, forest, or desert.
e.   I can find examples of endangered Utah plants and animals and describe steps being taken to protect them.

Objective 3: Use a simple scheme to classify Utah plants and animals.
a.   I can explain how scientists use classification schemes.
b.   I can use a simple classification system to classify unfamiliar Utah plants or animals (e.g., fish/amphibians/reptile/bird/mammal, invertebrate/vertebrate, tree/shrub/grass, deciduous/conifers).

Objective 4: Observe and record the behavior of Utah animals.
a.   I can observe and record the behavior of birds (e.g., caring for young, obtaining food, surviving winter).
b.   I can describe how the behavior and adaptations of Utah mammals help them survive winter (e.g., obtaining food, building homes, hibernation, migration).
c.   I can research and report on the behavior of a species of Utah fish (e.g., feeding on the bottom or surface, time of year and movement of fish to spawn, types of food and how it is obtained).
d.   I can compare the structure and behavior of Utah amphibians and reptiles.
e.   I can use simple classification schemes to sort Utah's common insects and spiders.

Science language students should use:	wetland, forest, desert, adaptation, deciduous, coniferous, invertebrate, vertebrate, bird, amphibian, reptile, fish, mammal, insect, hibernation, migration
Common plants:	sagebrush, pinyon pine, Utah juniper, spruce, fir, oak brush, quaking aspen, cottonwood, cattail, bulrush, prickly pear cactus
Common animals:	jackrabbit, cottontail rabbit, red fox, coyote, mule deer, elk, moose, cougar, bobcat, deer mouse, kangaroo rat, muskrat, beaver, gopher snake, rattlesnake, lizard, tortoise, frog, salamander, red–tailed hawk, barn owl, lark, robin, pinyon jay, magpie, crow, trout, catfish, carp, grasshopper, ant, moth, butterfly, housefly, bee, wasp, pill bug, millipede