

# Physical Geography

## Texas Essential Knowledge and Skills (TEKS)

| 4 <sup>th</sup> grade  | 5 <sup>th</sup> grade  | 6 <sup>th</sup> grade   | 7 <sup>th</sup> grade   | 8 <sup>th</sup> grade   |
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| <p><i>Science TEKS</i></p> <p>(7) Earth and space. The students know that Earth consists of useful resources and its surface is constantly changing. The student is expected to:</p> <p>(A) examine properties of soils, including color and texture, capacity to retain water, and ability to support the growth of plants;</p> <p>(B) observe and identify slow changes to Earth's surface caused by weathering, erosion, and deposition from water, wind, and ice;</p> <p>(C) identify and classify Earth's renewable resources, including air, plants, water, and animals; and nonrenewable resources, including coal, oil, and natural gas;</p> | <p><i>Science TEKS</i></p> <p>(7) Earth and space. The student knows Earth's surface is constantly changing and consists of useful resources. The student is expected to:</p> <p>(A) explore the processes that led to the formation of sedimentary rocks and fossil fuels;</p> <p>(B) recognize how landforms such as deltas, canyons, and sand dunes are the result of changes to Earth's surface by wind, water, and ice;</p> <p>(8) Earth and space. The student knows that there are recognizable patterns in the natural world and among the Sun, Earth, and Moon system. The student is expected to:</p> <p>(A) differentiate between weather and climate;</p> <p>(B) explain how the Sun and the ocean</p> | <p>Social Studies TEKS</p> <p>6. understands that geographical patterns result from physical environmental processes [GS7, GS8]</p> <p>6a. describe and explain the effects of physical environmental processes such as erosion, ocean currents, and earthquakes on Earth's surface [GS7-1B, 3]</p> <p>6b. identify the location of renewable and nonrenewable natural resources such as fresh water, fossil fuels, fertile soils, and timber; [GS8-2,3]</p> <p><i>Science TEKS</i></p> <p>(10) Earth and space. The student understands the structure of Earth, the rock cycle, and plate tectonics. The</p> | <p><i>Science TEKS</i></p> <p>(10) Earth and space. The student understands the structure of Earth, the rock cycle, and plate tectonics. The student is expected to:</p> <p>(A) build a model to illustrate the structural layers of Earth, including the inner core, outer core, mantle, crust, asthenosphere, and lithosphere;</p> <p>(B) classify rocks as metamorphic, igneous, or sedimentary by the processes of their formation;</p> <p>(C) identify the major tectonic plates, including Eurasian, African, Indo-Australian, Pacific, North American, and South American; and</p> <p>(D) describe how plate tectonics causes major geological events such as ocean basins, earthquakes, volcanic eruptions,</p> | <p><i>Science TEKS</i></p> <p>(7) Earth and space. The student knows the effects resulting from cyclical movements of the Sun, Earth, and Moon. The student is expected to:</p> <p>(A) model and illustrate how the tilted Earth rotates on its axis, causing day and night, and revolves around the Sun causing changes in seasons;</p> <p>(B) demonstrate and predict the sequence of events in the lunar cycle; and</p> <p>(C) relate the position of the Moon and Sun to their effect on ocean tides.</p> <p>(9) Earth and space. The student knows that natural events can impact Earth systems. The student is expected to:</p> <p>(A) describe the historical development of evidence that supports plate tectonic theory;</p> <p>(B) relate plate tectonics to the formation of crustal features; and</p> <p>(C) interpret topographic maps and satellite views to identify land and erosional features and predict how these features may be</p> |

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| <p>and the importance of conservation.</p> <p>(8) Earth and space. The student knows that there are recognizable patterns in the natural world and among the Sun, Earth, and Moon system. The student is expected to:</p> <p>(A) measure and record changes in weather and make predictions using weather maps, weather symbols, and a map key;</p> <p>(B) describe and illustrate the continuous movement of water above and on the surface of Earth through the water cycle and explain the role of the Sun as a major source of energy in this process; and</p> <p>(C) collect and analyze data to identify sequences and predict patterns of change in shadows, tides, seasons, and the observable appearance of the Moon over time.</p> <p>(9) Organisms and environments. The student knows and</p> | <p>interact in the water cycle;</p> <p>(C) demonstrate that Earth rotates on its axis once approximately every 24 hours causing the day/night cycle and the apparent movement of the Sun across the sky; and</p> <p>(D) identify and compare the physical characteristics of the Sun, Earth, and Moon.</p> <p>(9) Organisms and environments. The student knows that there are relationships, systems, and cycles within environments. The student is expected to:</p> <p>(A) observe the way organisms live and survive in their ecosystem by interacting with the living and non-living elements;</p> <p>food, is transferred through a food chain and food web to consumers and decomposers;</p> <p>(C) predict the effects of changes in ecosystems caused by living</p> | <p>student is expected to:</p> <p>(A) build a model to illustrate the structural layers of Earth, including the inner core, outer core, mantle, crust, asthenosphere, and lithosphere;</p> <p>(B) classify rocks as metamorphic, igneous, or sedimentary by the processes of their formation;</p> <p>(C) identify the major tectonic plates, including Eurasian, African, Indo-Australian, Pacific, North American, and South American; and</p> <p>(D) describe how plate tectonics causes major geological events such as ocean basins, earthquakes, volcanic eruptions, and mountain building.</p> <p>(11) Earth and space. The student</p> | <p>and mountain building.</p> <p>(8) Earth and space. The student knows that natural events and human activity can impact Earth systems. The student is expected to:</p> <p>(A) predict and describe how different types of catastrophic events impact ecosystems such as floods, hurricanes, or tornadoes;</p> <p>(B) analyze the effects of weathering, erosion, and deposition on the environment in ecoregions of Texas; and</p> <p>(C) model the effects of human activity on groundwater and surface water in a watershed.</p> <p>(9) Earth and space. The student knows components of our solar system. The student is expected to:</p> <p>(A) analyze the characteristics of objects in our solar system that allow life to exist such as the proximity of the Sun, presence of water, and composition of the atmosphere; and</p> <p>(B) identify the accommodations, considering the characteristics of our solar system, that</p> | <p>reshaped by weathering.</p> <p>(10) Earth and space. The student knows that climatic interactions exist among Earth, ocean, and weather systems. The student is expected to:</p> <p>(A) recognize that the Sun provides the energy that drives convection within the atmosphere and oceans, producing winds and ocean currents;</p> <p>(B) identify how global patterns of atmospheric movement influence local weather using weather maps that show high and low pressures and fronts; and</p> <p>(C) identify the role of the oceans in the formation of weather systems such as hurricanes.</p> <p>(11) Organisms and environments. The student knows that interdependence occurs among living systems and the environment and that human activities can affect these systems. The student is expected to:</p> <p>(A) describe producer/consumer, predator/prey, and parasite/host relationships as they occur in food webs within marine, freshwater, and terrestrial ecosystems;</p> <p>(B) investigate how organisms and populations in an ecosystem depend on and may compete for</p> |
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| <p>understands that living organisms within an ecosystem interact with one another and with their environment. The student is expected to:</p> <p>(A) investigate that most producers need sunlight, water, and carbon dioxide to make their own food, while consumers are dependent on other organisms for food; and</p> <p>(B) describe the flow of energy through food webs, beginning with the Sun, and predict how changes in the ecosystem affect the food web such as a fire in a forest.</p> <p>(10) Organisms and environments. The student knows that organisms undergo similar life processes and have structures that help them survive within their environment. The student is expected to:</p> <p>(A) explore how adaptations enable organisms to survive in their environment such as comparing birds'</p> | <p>organisms, including humans, such as the overpopulation of grazers or the building of highways; and</p> <p>(D) identify the significance of the carbon dioxide-oxygen cycle to the survival of plants and animals.</p> <p>(10) Organisms and environments. The student knows that organisms undergo similar life processes and have structures that help them survive within their environments. The student is expected to:</p> <p>(A) compare the structures and functions of different species that help them live and survive such as hooves on prairie animals or webbed feet in aquatic animals;</p> | <p>understands the organization of our solar system and the relationships among the various bodies that comprise it. The student is expected to:</p> <p>(A) describe the physical properties, locations, and movements of the Sun, planets, Galilean moons, meteors, asteroids, and comets;</p> <p>(B) understand that gravity is the force that governs the motion of our solar system; and</p> <p>(C) describe the history and future of space exploration, including the types of equipment and transportation needed for space travel.</p> <p>(12) Organisms and environments. The student knows all organisms are classified into Domains and Kingdoms. Organisms within these taxonomic groups share similar characteristics which allow them to interact with the living and</p> | <p>enabled manned space exploration.</p> <p>(10) Organisms and environments. The student knows that there is a relationship between organisms and the environment. The student is expected to:</p> <p>(A) observe and describe how different environments, including microhabitats in schoolyards and biomes, support different varieties of organisms;</p> <p>(B) describe how biodiversity contributes to the sustainability of an ecosystem; and</p> <p>(C) observe, record, and describe the role of ecological succession such as in a microhabitat of a garden with weeds</p> | <p>biotic and abiotic factors such as quantity of light, water, range of temperatures, or soil composition;</p> <p>(C) explore how short- and long-term environmental changes affect organisms and traits in subsequent populations; and</p> <p>(D) recognize human dependence on ocean systems and explain how human activities such as runoff, artificial reefs, or use of resources have modified these systems.</p> |
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| <p>beaks and leaves on plants;</p> |  | <p>nonliving parts of their ecosystem. The student is expected to:</p> <p>(E) describe biotic and abiotic parts of an ecosystem in which organisms interact; and</p> <p>(F) diagram the levels of organization within an ecosystem, including organism, population, community, and ecosystem.</p> |  |  |
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## Texas College and Career Readiness Standards

Sc.X.A; B Earth systems; Energy

Sc.X.C Populations

## National Geography Standards

| Standard   | 4 <sup>th</sup> grade   | 8 <sup>th</sup> grade  |
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| <p><a href="#">7 The physical processes that shape the patterns of Earth's surface</a></p> | <p>1. There are four components of Earth's physical systems (the atmosphere, biosphere, hydrosphere, and lithosphere)</p> <p><i>Therefore, the student is able to:</i></p> <p>A. Identify attributes of Earth's different physical systems, as exemplified by being able to</p> <ul style="list-style-type: none"> <li>• Identify different attributes of physical systems in photographs (e.g., sky, clouds, plants, soil, oceans, lakes, mountains).</li> <li>• Identify examples of water features on Earth's surface that comprise the hydrosphere (e.g., oceans, rivers, lakes, water vapor, ground water, different types of precipitation).</li> <li>• Identify examples of landforms on Earth's surface (e.g., mountains, volcanoes, valleys, plains).</li> </ul> <p>2. Earth-Sun relationships affect conditions on Earth</p> <p><i>Therefore, the student is able to:</i></p> <p>A. Describe how Earth's position relative to the Sun affects conditions on Earth, as exemplified by being able to</p> <ul style="list-style-type: none"> <li>• Describe the relationship between the cycle of seasons and months in the Northern and Southern hemispheres.</li> <li>• Describe the differences in seasons based on latitude (e.g., first and last frost in different locations, length of growing season, bird migrations).</li> </ul> | <p>1. The four components of Earth's physical systems (the atmosphere, biosphere, hydrosphere, and lithosphere) are interdependent</p> <p><i>Therefore, the student is able to:</i></p> <p>A. Identify and describe patterns in the environment that result from the interaction of Earth's physical processes, as exemplified by being able to</p> <ul style="list-style-type: none"> <li>• Identify and describe the connections between ocean circulation system and climate (e.g., North Atlantic Drift and the mild climate of Western Europe, the climatic effects of El Niño or La Niña).</li> <li>• Identify and describe the patterns that result from the connections between climate and vegetation (e.g., examples of patterns of ecosystems and biomes).</li> <li>• Identify and describe the patterns of physical features that result from erosion and deposition (e.g., estuaries and deltas, canyons, alluvial plains, sand dunes).</li> </ul> <p>B. Analyze and explain patterns of physical features resulting from the interactions of Earth's physical processes, as exemplified by being able to</p> <ul style="list-style-type: none"> <li>• Analyze maps of tectonic plates to predict the location of physical features (e.g., mountain ranges, volcanoes, rift valleys).</li> <li>• Analyze the pattern of glacial features as a result of glacial retreat (e.g., moraines, kettle lakes, cirques).</li> </ul> |

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|  | <ul style="list-style-type: none"> <li>• Describe the changes in daily sunrise and sunset and length of daylight hours by recording the change in times over the span of the school year.</li> </ul> <p>3. Physical processes shape features on Earth’s surface</p> <p><i>Therefore, the student is able to:</i></p> <p>A. Identify examples of physical processes, as exemplified by being able to</p> <ul style="list-style-type: none"> <li>• Identify different cycles in Earth’s systems (e.g., water cycle, carbon cycle, wind or water erosion, weathering, deposition, mass wasting).</li> <li>• Identify the components and relationships in the water cycle.</li> <li>• Identify the components and relationships in the erosion cycle (e.g., water carving canyons, wind sculpting mesas, landslides, avalanches).</li> <li>• B. Describe how physical processes shape features on Earth’s surface, as exemplified by being able to</li> <li>• Describe landforms by constructing 3-D physical models and organize the models into groups formed by similar processes.</li> <li>• Describe the physical processes that shaped particular landform features using pictures of landforms such as canyons, mesas, and deltas.</li> <li>• Describe how freeze–thaw processes erode rock (e.g., potholes on local streets, rock slides in mountain regions).</li> </ul> | <ul style="list-style-type: none"> <li>• Analyze and explain factors influencing precipitation patterns and predict where the patterns will occur (e.g., convectional, orographic, frontal).</li> </ul> <p>2. Earth-Sun relationships drives physical processes that follow an annual cycle and create patterns on Earth</p> <p><i>Therefore, the student is able to:</i></p> <p>A. Explain how Earth-Sun relationships drive Earth’s physical processes and create annual patterns, as exemplified by being able to</p> <ul style="list-style-type: none"> <li>• Explain the occurrences of weather phenomena in different locations due to annual changes in the Earth-Sun relationship (e.g., hurricanes in the fall in subtropical areas, monsoon rainfall, tornadoes in the mid-latitudes during the spring and summer).</li> <li>• Explain why the hours of visible sunlight changes with seasons (e.g., the equatorial region experiences approximately 12 hours of sunlight year round while places in the Arctic and Antarctic circles vary from 0 to 24 hours of visible sunlight).</li> <li>• Describe how the angle of the Sun’s rays changes at different latitudes by shining a light directly on the equator of a globe and noting the change in the location (on the tropic lines) and angle of the direct rays as the tilted globe is moved to represent the different seasons.</li> </ul> |
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|   |   | <p>3. Physical processes generate patterns of features across Earth's surface</p> <p><i>Therefore, the student is able to:</i></p> <p>A. Analyze and explain the patterns that occur on Earth's surface as a result of physical processes, as exemplified by being able to</p> <ul style="list-style-type: none"> <li>• Explain the effects of variations in seasonal precipitation on rivers or vegetation (e.g., amount of snowfall, flash floods, 100-year rain event on rivers, lakes, shorelines, forests).</li> <li>• Explain how physical processes related to plate tectonics form islands (e.g., Hawaiian Islands) or increase the elevation of mountains (e.g., Himalayan Mountains).</li> <li>• Explain the effects of erosion processes on landscape features over time (e.g., Chimney Rock, Devil's Tower, Grand Canyon, Arches National Park).</li> </ul> |
| <p><a href="#">8 The characteristics and spatial distribution of ecosystems and biomes on Earth's surface</a></p> | <p>1. The components of ecosystems<br/><i>Therefore, the student is able to:</i></p> <p>A. Identify the components of different ecosystems, as exemplified by being able to</p> <ul style="list-style-type: none"> <li>• Identify the three major components of an ecosystem (i.e., biomass, climate, and soil).</li> <li>• Identify examples of each ecosystem component (e.g., pine trees versus grasslands, low versus high rainfall, clay versus sandy soils).</li> <li>• Describe local ecosystems by surveying and recording the properties of their components.</li> </ul> <p>2. The characteristics of ecosystems</p> | <p>1. Components of ecosystems are interdependent</p> <p><i>Therefore, the student is able to:</i></p> <p>A. Describe how the components of ecosystems are connected and contribute to the energy of their own cycles, as exemplified by being able to</p> <ul style="list-style-type: none"> <li>• Describe the flow of energy and the cycling of matter through an ecosystem (e.g., the food chain, photosynthesis).</li> <li>• Identify and describe how carbon can be absorbed and stored in Earth's physical</li> </ul>  |

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|  | <p><i>Therefore, the student is able to:</i></p> <p>A. Identify and describe the characteristics of ecosystems, as exemplified by being able to</p> <p>Identify and describe the characteristics of an ecosystem (specific types of plants, climate, and soil) in which a favorite or interesting creature lives.</p> <p>Identify and draw pictures of different plants and animals in various local ecosystems (e.g., a pond, forest, city park).</p> <p>Compare the characteristics of different ecosystems (e.g., pond, deciduous forest, coral reef).</p> <p>3. The characteristics of biomes</p> <p><i>Therefore, the student is able to:</i></p> <p>A. Describe the characteristics of biomes, as exemplified by being able to</p> <ul style="list-style-type: none"> <li>• Describe the defining characteristics of a biome as a large region of ecosystems with similar climate and vegetation characteristics.</li> <li>• Describe the temperature, precipitation, and vegetation characteristics of various biomes, (e.g., deserts, grasslands, savannahs, temperate forests, tropical forests, arctic tundra).</li> <li>• Identify the characteristics in photographs of different types of vegetation and match them to the appropriate sections of a world climate map (e.g., cacti and succulents on a desert climate region, tropical forest trees on a tropical climate region, coral in shallow, tropical marine waters).</li> </ul> | <p>systems (e.g., oceans, tropical forests, vegetation).</p> <ul style="list-style-type: none"> <li>• Identify and describe the variable components in an ocean ecosystem that influence the interdependencies in an ecosystem (e.g., water temperature, depth, salinity, acidity, plants, fish, and marine mammals in an aquatic ecosystem).</li> </ul> <p>B. Construct a model to explain how an ecosystem works, as exemplified by being able to</p> <ul style="list-style-type: none"> <li>• Construct a food chain or web of food chains by sequentially arranging pictures or samples of a variety of living things (e.g., fungi, insects, plants, animals) to identify interactions within ecosystems.</li> <li>• Construct an aquarium or terrarium to explain the interacting components in an ecosystem.</li> <li>• Construct a flow chart to explain the interactions of components within an ecosystem (e.g., water cycle, oxygen and carbon dioxide exchange, producers, consumers, and decomposers).</li> </ul> <p>2. Physical processes determine the characteristics of ecosystems</p> <p><i>Therefore, the student is able to:</i></p> <p>A. Describe and explain how physical processes determine the characteristics of ecosystems, as exemplified by being able to</p> <ul style="list-style-type: none"> <li>• Describe the rain shadow effect of orographic precipitation and identify the different ecosystems on the windward and leeward side of a mountain range or</li> </ul> |
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|  |  | <p>island (e.g., temperate rain forest on the windward side and high desert on the leeward side of the Cascade Mountain Range).</p> <ul style="list-style-type: none"> <li>• Explain how different locations can have similar ecosystems as a function of temperature, precipitation, elevation, and latitude by using climographs and vegetation maps.</li> <li>• Explain how ocean currents influence the characteristics of ecosystems (e.g., the Peru current and the Atacama Desert, the Benguela current and Namib Desert, East Indian current in the Bay of Bengal and monsoon season in India).</li> </ul> <p>3. Climate primarily determines the characteristics and geographic distribution of biomes</p> <p><i>Therefore, the student is able to:</i></p> <p>A. Describe and explain how climate (temperature and rainfall) primarily determines the characteristics and geographic distribution of biomes, as exemplified by being able to</p> <ul style="list-style-type: none"> <li>• Construct climographs (using temperature and precipitation data) for several different biomes to explain the distribution of biomes.</li> <li>• Describe the changing vegetation zones with increasing altitude for a mountain located near the equator (e.g., Mount Kilimanjaro in Tanzania, Mount Chimborazo in Peru).</li> <li>• Explain how biomes do not always follow lines of latitude by identifying the influences of oceans and mountain ranges on the distribution of climate and vegetation.</li> </ul> |
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