MA 2016 ST
Possibl

Grade 6 Quarter 1

Grade 6 Quarter 2

Grade 6 Quarter 3

4-ESS2-2

6.MS-ESS2-3. Analyze and interpret maps showing the distribution of fossils and rocks, continental shapes, and seafloor structures to provide evidence that Earth's plates have moved great distances, collided, and spread apart. Clarification Statement: Maps may show similarities of rock and fossil types on different continents, the shapes of the continents (including continental shelves), and the locations of ocean structures (such as ridges, fracture zones, and trenches) similar to Wegener's visuals. State Assessment Boundary: Mechanisms for plate motion or paleomagnetic anomalies in oceanic and continental crust are not not expected in state assessment.

4-ESS1-1

6.MS-ESS1-4. Analyze and interpret rock layers and index fossils to determine the relative ages of rock formations that result from processes occurring over long periods of time. Clarification Statements: Analysis includes laws of superposition and crosscutting relationships limited to minor displacement faults that offset layers. Processes that occur over long periods of time include changes in rock types through weathering, erosion, heat, and pressure. State Assessment Boundary: Strata sequences that have been reordered or overturned, names of specific periods or epochs and events within them, or the identification and naming of minerals or rock types are not expected in state assessment.

3-LS4-4

6.MS-LS4-1. Analyze and interpret evidence from the fossil record to describe organisms and their environment, extinctions, and changes to life forms throughout the history of the Earth. Clarification Statement: Examples of evidence include sets of fossils that indicate a specific type of environment, anatomical structures that indicate the function of an organism in the environment, and fossilized tracks that indicate behavior of organisms. State Assessment Boundary: Names of individual species, geological eras in the fossil record, or mechanisms for extinction or speciation are not expected in state assessment.

3-LS4-1

4-LS1-1

HS-LS4-1

6.MS-LS4-2. Construct an argument using anatomical structures to support evolutionary relationships among and between fossil organisms and modern organisms. Clarification Statement: Evolutionary relationships include (a) some organisms have similar traits with similar functions because they were inherited from a common ancestor, (b) some organisms have similar traits that serve similar functions because they live in similar environments, and (c) some organisms have traits inherited from common ancestors that no longer serve their original function because their environments are different from their ancestors' environments.

6.MS-LS1-1. Provide evidence that organisms (unicellular and multicellular) are made of cells. Clarification Statement: Evidence can be drawn from multiple types of organisms, such as plants, animals and bacteria.

4-LS1-1

6.MS-LS1-2. Develop and use a model to describe how parts of the cell contribute to the cellular functions of obtaining food, water, and other nutrients from its environment, disposing of waste, and providing energy for cellular process. Clarification Statement: Parts of plant and animal cells include (a) the nucleus, which contains a cell's genetic material and regulates its activities; (b) chloroplasts, which produce necessary food (sugar) and oxygen through photosynthesis (in plants); (c) mitochondria, which release energy from food through cellular respiration; (d) vacuoles, which store materials, including water, nutrients, and waste; (e) the cell membrane, which is a selective barrier that enables nutrients to enter the cell and wastes to be expelled; and (f) the cell wall, which provides structural support (in plants). State Assessment Boundary: Specific biochemical steps or chemical processes, the role of ATP, active transport processes involving the cell membrane, or identifying or comparing different types of cells are not expected in state assessment.

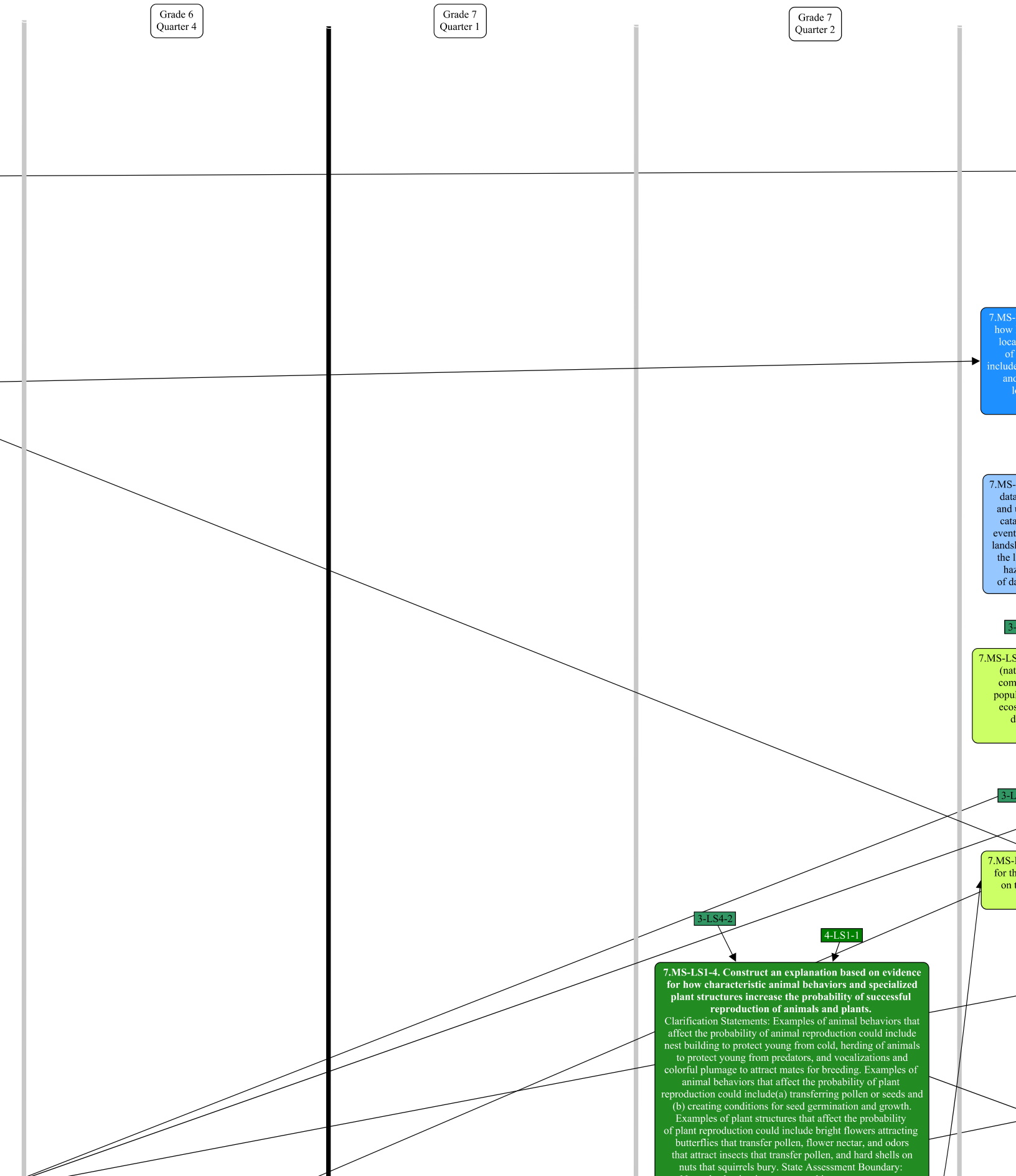
4-PS3-2

HS-PS1-4

6.MS-PS1-6. Plan and conduct an experiment using exothermic and endothermic reactions to measure and describe the release or absorption of thermal energy released. Clarification Statements: Emphasis is on describing transfer of energy to and from the environment. Examples of chemical reactions could include dissolving ammonium chloride or calcium chloride.

6.MS-PS1-7(MA). Use a particulate model of matter to

6 STE Middle School Standards Strand Map (June 2016)
ssible INTEGRATED units QUARTERLY PLANS



Please direct comments, suggested edits, and questions to: mathsciencetech@doe.mass.edu.
The standards and strand maps are available at: www.doe.mass.edu/omste/review.html
(*) denotes integration of technology/engineering through a practice or core idea.

Grade 7 Quarter 3

Grade 7 Quarter 4

Grade 8 Quarter 1

4-ESS2-2

4-ESS2-1

7.MS-ESS2-2. Construct an explanation based on evidence for how Earth's surface has changed over scales that range from local to global in size. Clarification Statements: Examples of processes occurring over large, global spatial scales include plate motion, formation of mountains and ocean basins, and ice ages. Examples of changes occurring over small, local spatial scales include earthquakes and seasonal weathering and erosion.

4-ESS3-2

7.MS-ESS3-2. Obtain and communicate information on how data from past geologic events are analyzed for patterns and used to forecast the location and likelihood of future catastrophic events. Clarification Statements: Geologic events include earthquakes, volcanic eruptions, floods, and landslides. Examples of data typically analyzed can include the locations, magnitudes, and frequencies of the natural hazards. State Assessment Boundary: Active analysis of data or forecasting is not expected in state assessment.

HS-ESS3-1

3-LS4-3

7.MS-LS2-4. Analyze data to provide evidence that disruptions (natural or human-made) to any physical or biological component of an ecosystem can lead to shifts in all its populations. Clarification Statement: Focus should be on ecosystem characteristics varying over time, including disruptions such as hurricanes, floods, wildfires, oil spills, and construction.

3-LS4-4

HS-LS2-2

HS-LS4-2

7.MS-LS2-1. Analyze and interpret data to provide evidence for the effects of periods of abundant and scarce resources on the growth of organisms and the size of populations in an ecosystem.

HS-LS2-1

5-PS1-4

8.MS-PS1-2. Analyze and interpret data on the properties of substances before and after the substances interact to determine if a chemical reaction has occurred. Clarification Statements: Examples of reactions could include burning sugar or steel wool, fat reacting with sodium hydroxide, and mixing zinc with HCl. Properties of substances include: density, melting point, boiling point, solubility, flammability, and odor.

5-PS1-2

8.MS-PS1-5. Use a model to explain that atoms are rearranged during a chemical reaction to form new substances with new properties. Explain that the atoms present in the reactants are all present in the products and thus the total number of atoms is conserved. Clarification Statement: Examples of models can include physical models or drawings, including digital forms, that represent atoms. State Assessment Boundary: Use of atomic masses, molecular weights, balancing symbolic equations or intermolecular forces is not expected in state assessment.

HS-PS1-7

5-PS3-1

8.MS-LS1-7. Use informational text to describe that food molecules, including carbohydrates, proteins, and fats, are broken down and rearranged through chemical reactions forming new molecules that support cell growth and/or release of energy. State Assessment Boundary: Specific details of the chemical reaction for cellular respiration, biochemical steps of breaking down food, or the resulting molecules (e.g., carbohydrates are broken down into monosaccharides) are not expected in state assessment.

HS-LS1-7

HS-LS1-6

HS-LS1-5

Each Year ~ 180 days; Each Quarter ~ 45 days
1 unit/Q ~ 45 days, 9 weeks
2 units/Q ~22 days, 4.5 weeks
3 units/Q ~15 days, 3 weeks

Grade 8 Quarter 2

Grade 8 Quarter 3

Grade 8 Quarter 4

4-ESS2-2

8.MS-ESS2-1.Use a model to illustrate that energy from the Earth's interior drives convections which cycles Earth's crust leading to melting, crystallization, weathering, and deformation of large rock formations, including generation of ocean sea floor at ridges, submergence of ocean sea floor at trenches, mountain building, and active volcanic chains. Clarification Statement: The emphasis is on large-scale cycling resulting from plate tectonics.

HS-ESS2-3

HS-ESS1-5

8.MS-ETS2-4(MA). Use informational text to illustrate that materials maintain their composition under various kinds of physical processing; however, some material properties may change if a process changes the particulate structure of a material. Clarification Statement: Examples of physical processing can include cutting, forming, extruding, and sanding. Examples of changes in material properties can include a non-magnetic iron material becoming magnetic after hammering and a plastic material becoming rigid (less elastic) after heat treatment.

HS-ETS2-4(MA)

8.MS-ETS2-5(MA). Present information that illustrates how a product can be created using basic processes in manufacturing systems, including forming, separating, conditioning, assembling, finishing, quality control, and safety. Compare the advantages and disadvantages of human vs. computer control of these processes.

5-PS1-1

4-PS3-1

8.MS-PS1-4. Develop a model that describes and predicts changes in particle motion, relative spatial arrangement, temperature, and state of a pure substance when thermal energy is added or removed. Clarification Statements: Emphasis is on qualitative molecular-level models of solids, liquids, and gases to show that adding or removing thermal energy increases or decreases kinetic energy of the particles until a change of state occurs. Examples of models could include drawings and diagrams. Examples of pure substances could include water, carbon dioxide, and helium.

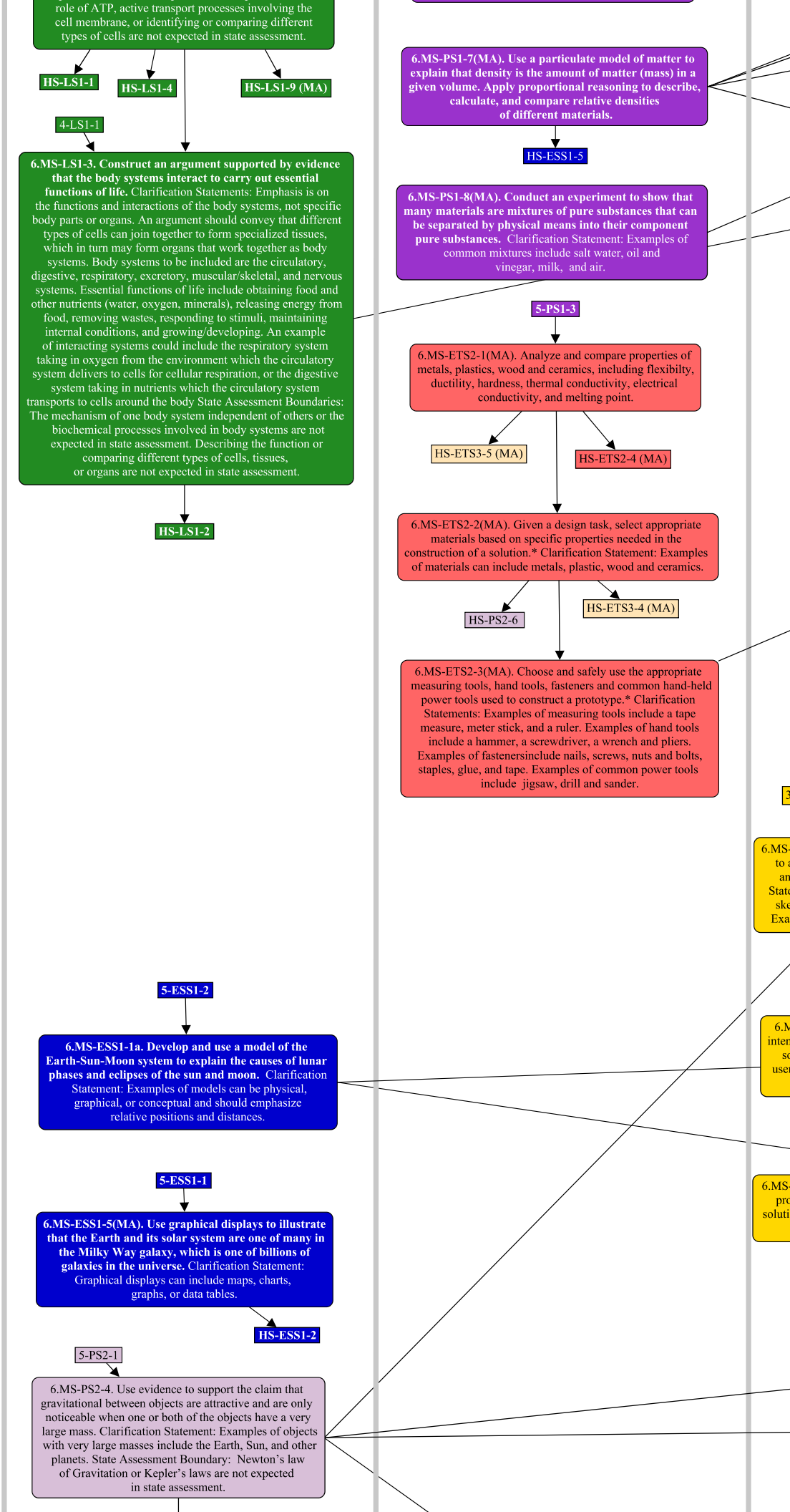
HS-PS1-5

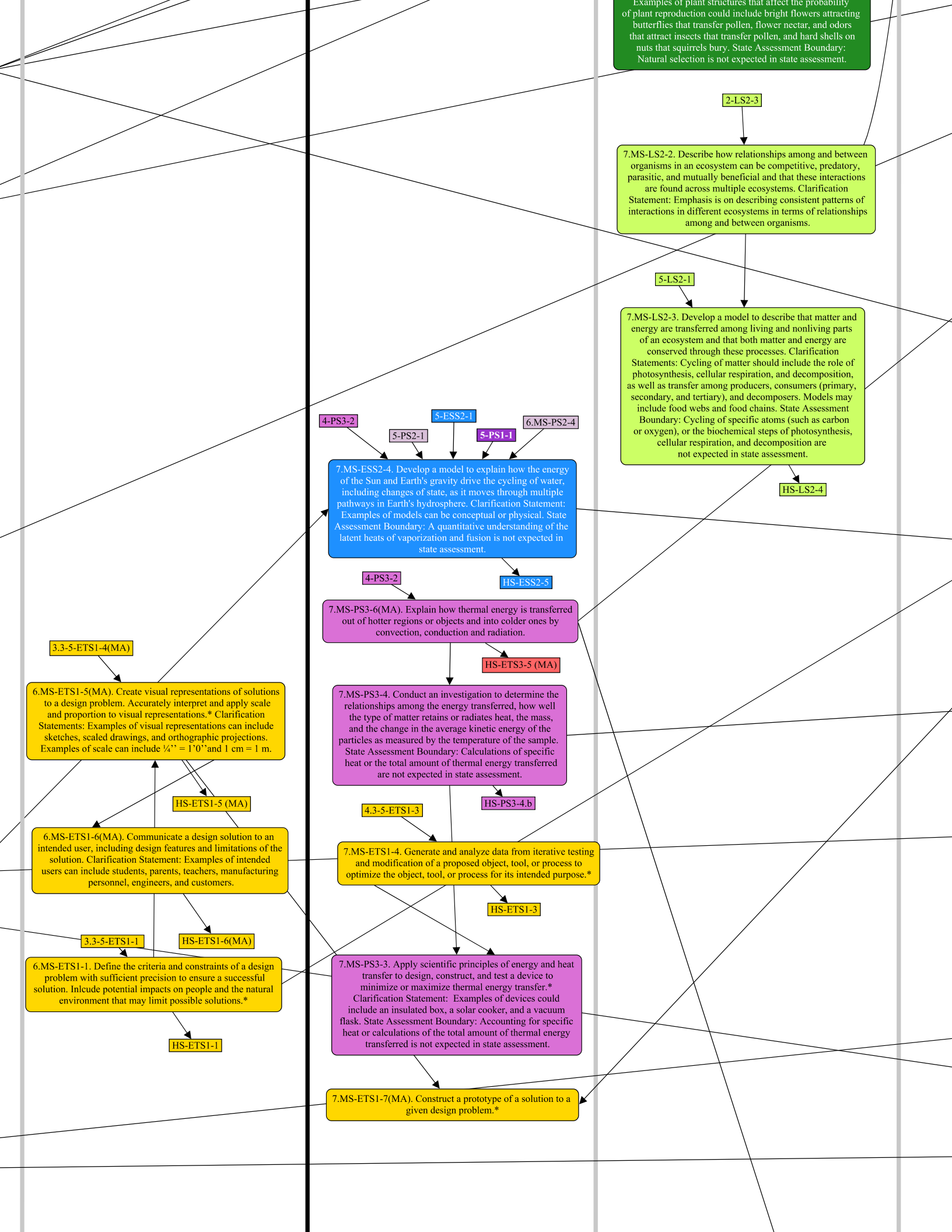
HS-PS2-8(MA)

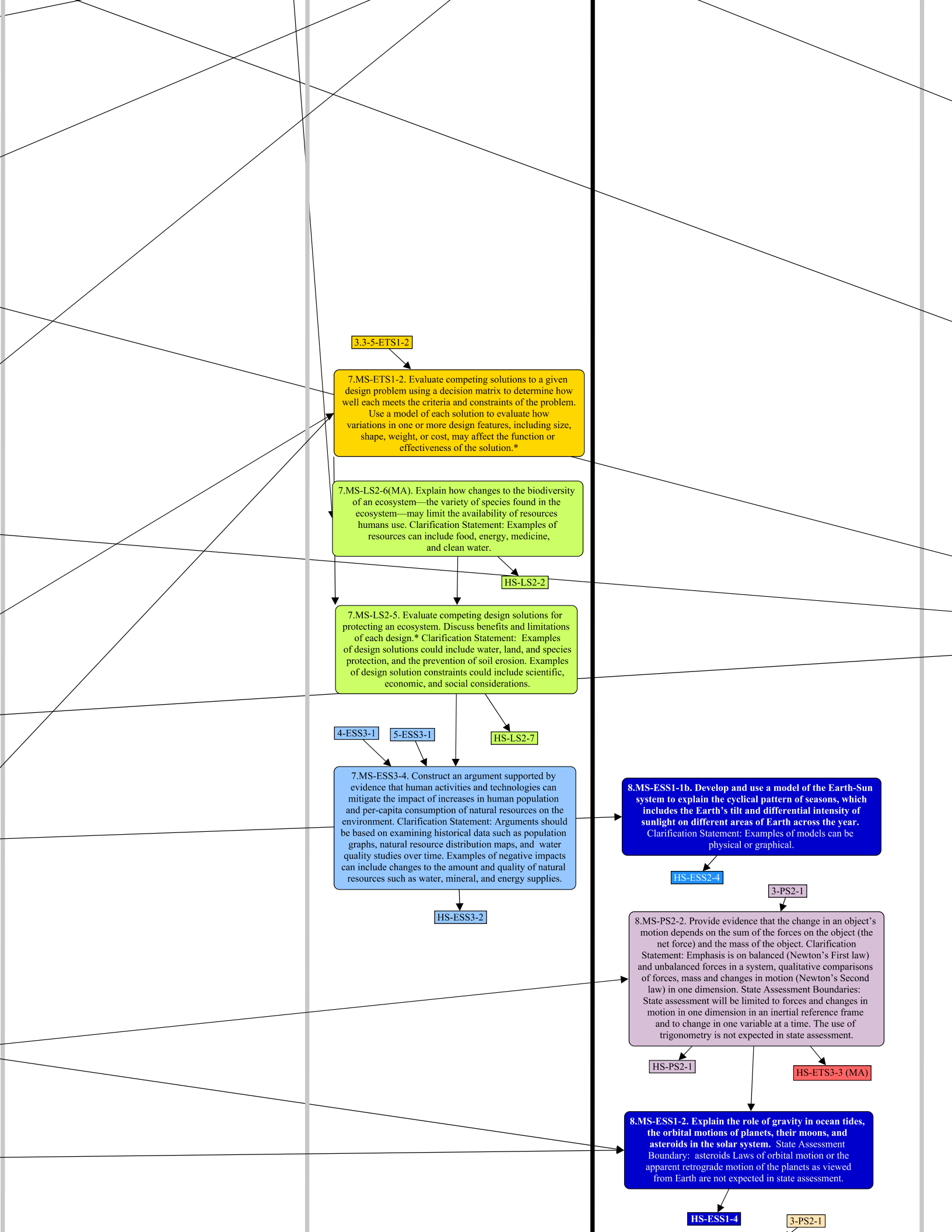
8.MS-PS1-1. Develop a model to describe that (a) atoms combine in a multitude of ways to produce pure substances which make up all of the living and nonliving things that we encounter, (b) atoms form molecules and compounds that range in size from two to thousands of atoms, and (c) mixtures are composed of different proportions of pure substances. Clarification Statement: Examples of molecular-level models could include drawings, three-dimensional ball and stick structures, and computer representations showing different molecules with different types of atoms. State Assessment Boundary: Valence electrons and bonding energy, the ionic nature of subunits of complex structures, complete depictions of all individual atoms in a complex molecule or extended structure, or calculations of proportions in mixtures are not expected in state assessment.

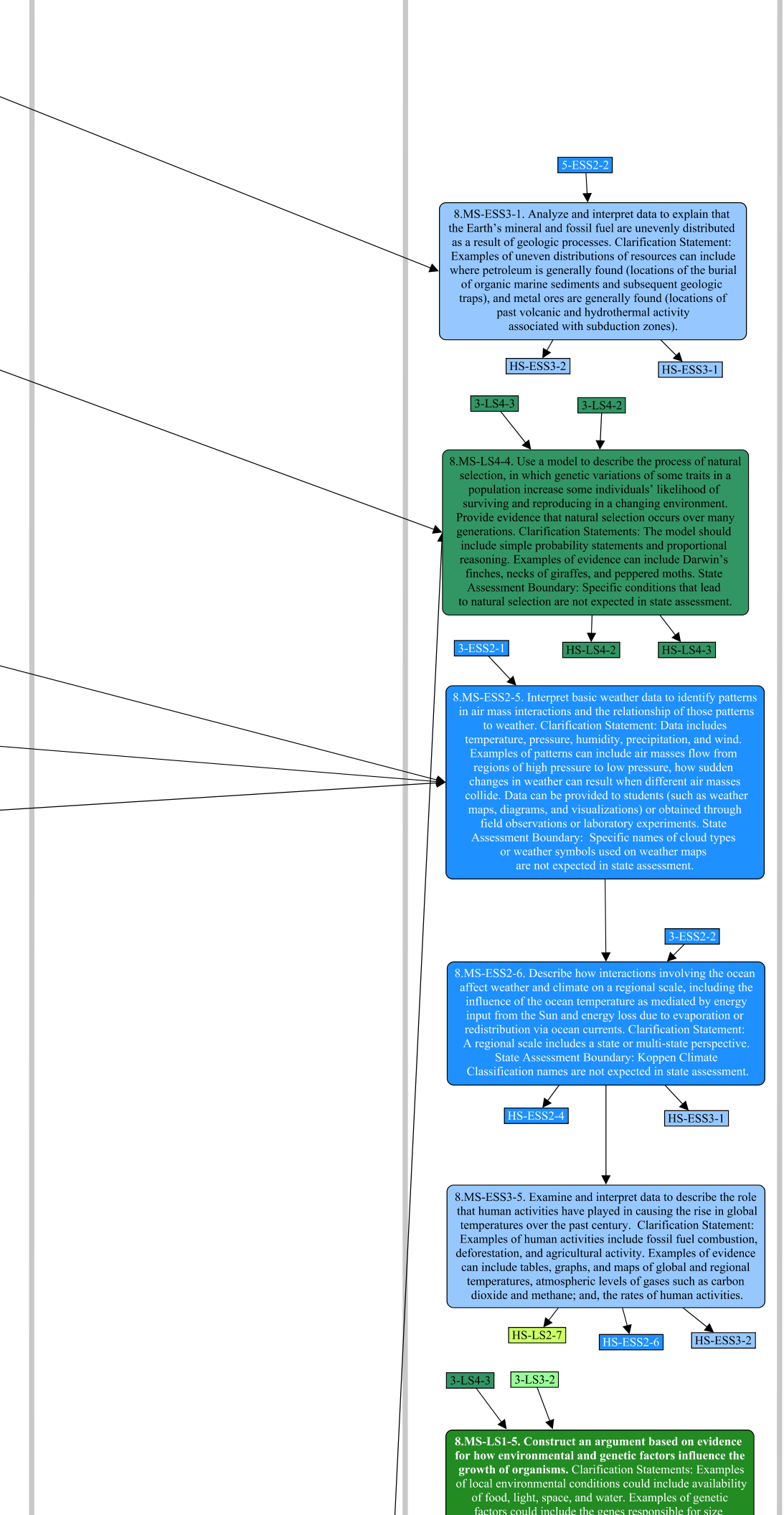
HS-ESS1-3

HS-PS1-3


role of ATP, active transport processes involving the cell membrane, or identifying or comparing different types of cells are not expected in state assessment.
HS-LS1-1
HS-LS1-4
HS-LS1-9 (MA)
4-LS1-1
6.MS-LS1-3. Construct an argument supported by evidence that the body systems interact to carry out essential functions of life. Clarification Statements: Emphasis is on the functions and interactions of the body systems, not specific body parts or organs. An argument should convey that different types of cells can join together to form specialized tissues, which in turn may form organs that work together as body systems. Body systems to be included are the circulatory, digestive, respiratory, excretory, muscular/skeletal, and nervous systems. Essential functions of life include obtaining food and other nutrients (water, oxygen, minerals), releasing energy from food, removing wastes, responding to stimuli, maintaining internal conditions, and growing/developing. An example of interacting systems could include the respiratory system taking in oxygen from the environment which the circulatory system delivers to cells for cellular respiration, or the digestive system taking in nutrients which the circulatory system transports to cells around the body State Assessment Boundaries: The mechanism of one body system independent of others or the biochemical processes involved in body systems are not expected in state assessment. Describing the function or comparing different types of cells, tissues, or organs are not expected in state assessment.
HS-LS1-2
6.MS-PS1-7(MA). Use a particulate model of matter to explain that density is the amount of matter (mass) in a given volume. Apply proportional reasoning to describe, calculate, and compare relative densities of different materials.
HS-ESS1-5
6.MS-PS1-8(MA). Conduct an experiment to show that many materials are mixtures of pure substances that can be separated by physical means into their component pure substances. Clarification Statement: Examples of common mixtures include salt water, oil and vinegar, milk, and air.
5-PS1-3
6.MS-ETS2-1(MA). Analyze and compare properties of metals, plastics, wood and ceramics, including flexibilty, ductility, hardness, thermal conductivity, electrical conductivity, and melting point.
HS-ETS3-5 (MA)
HS-ETS2-4 (MA)
6.MS-ETS2-2(MA). Given a design task, select appropriate materials based on specific properties needed in the construction of a solution.* Clarification Statement: Examples of materials can include metals, plastic, wood and ceramics.
HS-PS2-6
HS-ETS3-4 (MA)
6.MS-ETS2-3(MA). Choose and safely use the appropriate measuring tools, hand tools, fasteners and common hand-held power tools used to construct a prototype.* Clarification Statements: Examples of measuring tools include a tape measure, meter stick, and a ruler. Examples of hand tools include a hammer, a screwdriver, a wrench and pliers. Examples of fastenersinclude nails, screws, nuts and bolts, staples, glue, and tape. Examples of common power tools include jigsaw, drill and sander.
5-ESS1-2
6.MS-ESS1-1a. Develop and use a model of the Earth-Sun-Moon system to explain the causes of lunar phases and eclipses of the sun and moon. Clarification Statement: Examples of models can be physical, graphical, or conceptual and should emphasize relative positions and distances.
5-ESS1-1
6.MS-ESS1-5(MA). Use graphical displays to illustrate that the Earth and its solar system are one of many in the Milky Way galaxy, which is one of billions of galaxies in the universe. Clarification Statement: Graphical displays can include maps, charts, graphs, or data tables.
HS-ESS1-2
5-PS2-1
6.MS-PS2-4. Use evidence to support the claim that gravitational between objects are attractive and are only noticeable when one or both of the objects have a very large mass. Clarification Statement: Examples of objects with very large masses include the Earth, Sun, and other planets. State Assessment Boundary: Newton's law of Gravitation or Kepler's laws are not expected in state assessment.


Examples of plant structures that affect the probability of plant reproduction could include bright flowers attracting butterflies that transfer pollen, flower nectar, and odors that attract insects that transfer pollen, and hard shells on nuts that squirrels bury. State Assessment Boundary: Natural selection is not expected in state assessment.
2-LS2-3
7.MS-LS2-2. Describe how relationships among and between organisms in an ecosystem can be competitive, predatory, parasitic, and mutually beneficial and that these interactions are found across multiple ecosystems. Clarification Statement: Emphasis is on describing consistent patterns of interactions in different ecosystems in terms of relationships among and between organisms.
5-LS2-1
7.MS-LS2-3. Develop a model to describe that matter and energy are transferred among living and nonliving parts of an ecosystem and that both matter and energy are conserved through these processes. Clarification Statements: Cycling of matter should include the role of photosynthesis, cellular respiration, and decomposition, as well as transfer among producers, consumers (primary, secondary, and tertiary), and decomposers. Models may include food webs and food chains. State Assessment Boundary: Cycling of specific atoms (such as carbon or oxygen), or the biochemical steps of photosynthesis, cellular respiration, and decomposition are not expected in state assessment.
HS-LS2-4
4-PS3-2
5-ESS2-1
5-PS2-1
5-PS1-1
6.MS-PS2-4
7.MS-ESS2-4. Develop a model to explain how the energy of the Sun and Earth's gravity drive the cycling of water, including changes of state, as it moves through multiple pathways in Earth's hydrosphere. Clarification Statement: Examples of models can be conceptual or physical. State Assessment Boundary: A quantitative understanding of the latent heats of vaporization and fusion is not expected in state assessment.
4-PS3-2
HS-ESS2-5
7.MS-PS3-6(MA). Explain how thermal energy is transferred out of hotter regions or objects and into colder ones by convection, conduction and radiation.
HS-ETS3-5 (MA)
3.3-5-ETS1-4(MA)
6.MS-ETS1-5(MA). Create visual representations of solutions to a design problem. Accurately interpret and apply scale and proportion to visual representations.* Clarification Statements: Examples of visual representations can include sketches, scaled drawings, and orthographic projections. Examples of scale can include ¼'' = 1'0''and 1 cm = 1 m.
7.MS-PS3-4. Conduct an investigation to determine the relationships among the energy transferred, how well the type of matter retains or radiates heat, the mass, and the change in the average kinetic energy of the particles as measured by the temperature of the sample. State Assessment Boundary: Calculations of specific heat or the total amount of thermal energy transferred are not expected in state assessment.
HS-PS3-4.b
HS-ETS1-5 (MA)
4.3-5-ETS1-3
6.MS-ETS1-6(MA). Communicate a design solution to an intended user, including design features and limitations of the solution. Clarification Statement: Examples of intended users can include students, parents, teachers, manufacturing personnel, engineers, and customers.
7.MS-ETS1-4. Generate and analyze data from iterative testing and modification of a proposed object, tool, or process to optimize the object, tool, or process for its intended purpose.*
HS-ETS1-3
3.3-5-ETS1-1
HS-ETS1-6(MA)
6.MS-ETS1-1. Define the criteria and constraints of a design problem with sufficient precision to ensure a successful solution. Inlcude potential impacts on people and the natural environment that may limit possible solutions.*
7.MS-PS3-3. Apply scientific principles of energy and heat transfer to design, construct, and test a device to minimize or maximize thermal energy transfer.* Clarification Statement: Examples of devices could include an insulated box, a solar cooker, and a vacuum flask. State Assessment Boundary: Accounting for specific heat or calculations of the total amount of thermal energy transferred is not expected in state assessment.
HS-ETS1-1
7.MS-ETS1-7(MA). Construct a prototype of a solution to a given design problem.*


3.3-5-ETS1-2
7.MS-ETS1-2. Evaluate competing solutions to a given design problem using a decision matrix to determine how well each meets the criteria and constraints of the problem. Use a model of each solution to evaluate how variations in one or more design features, including size, shape, weight, or cost, may affect the function or effectiveness of the solution.*
7.MS-LS2-6(MA). Explain how changes to the biodiversity of an ecosystem—the variety of species found in the ecosystem—may limit the availability of resources humans use. Clarification Statement: Examples of resources can include food, energy, medicine, and clean water.
HS-LS2-2
7.MS-LS2-5. Evaluate competing design solutions for protecting an ecosystem. Discuss benefits and limitations of each design.* Clarification Statement: Examples of design solutions could include water, land, and species protection, and the prevention of soil erosion. Examples of design solution constraints could include scientific, economic, and social considerations.
4-ESS3-1
5-ESS3-1
HS-LS2-7
7.MS-ESS3-4. Construct an argument supported by evidence that human activities and technologies can mitigate the impact of increases in human population and per-capita consumption of natural resources on the environment. Clarification Statement: Arguments should be based on examining historical data such as population graphs, natural resource distribution maps, and water quality studies over time. Examples of negative impacts can include changes to the amount and quality of natural resources such as water, mineral, and energy supplies.
HS-ESS3-2
8.MS-ESS1-1b. Develop and use a model of the Earth-Sun system to explain the cyclical pattern of seasons, which includes the Earth's tilt and differential intensity of sunlight on different areas of Earth across the year. Clarification Statement: Examples of models can be physical or graphical.
HS-ESS2-4
3-PS2-1
8.MS-PS2-2. Provide evidence that the change in an object's motion depends on the sum of the forces on the object (the net force) and the mass of the object. Clarification Statement: Emphasis is on balanced (Newton's First law) and unbalanced forces in a system, qualitative comparisons of forces, mass and changes in motion (Newton's Second law) in one dimension. State Assessment Boundaries: State assessment will be limited to forces and changes in motion in one dimension in an inertial reference frame and to change in one variable at a time. The use of trigonometry is not expected in state assessment.
HS-PS2-1
HS-ETS3-3 (MA)
8.MS-ESS1-2. Explain the role of gravity in ocean tides, the orbital motions of planets, their moons, and asteroids in the solar system. State Assessment Boundary: asteroids Laws of orbital motion or the apparent retrograde motion of the planets as viewed from Earth are not expected in state assessment.
HS-ESS1-4
3-PS2-1


5-ESS2-2
8.MS-ESS3-1. Analyze and interpret data to explain that the Earth's mineral and fossil fuel are unevenly distributed as a result of geologic processes. Clarification Statement: Examples of uneven distributions of resources can include where petroleum is generally found (locations of the burial of organic marine sediments and subsequent geologic traps), and metal ores are generally found (locations of past volcanic and hydrothermal activity associated with subduction zones).
HS-ESS3-2
HS-ESS3-1
3-LS4-3
3-LS4-2
8.MS-LS4-4. Use a model to describe the process of natural selection, in which genetic variations of some traits in a population increase some individuals' likelihood of surviving and reproducing in a changing environment. Provide evidence that natural selection occurs over many generations. Clarification Statements: The model should include simple probability statements and proportional reasoning. Examples of evidence can include Darwin's finches, necks of giraffes, and peppered moths. State Assessment Boundary: Specific conditions that lead to natural selection are not expected in state assessment.
3-ESS2-1
HS-LS4-2
HS-LS4-3
8.MS-ESS2-5. Interpret basic weather data to identify patterns in air mass interactions and the relationship of those patterns to weather. Clarification Statement: Data includes temperature, pressure, humidity, precipitation, and wind. Examples of patterns can include air masses flow from regions of high pressure to low pressure, how sudden changes in weather can result when different air masses collide. Data can be provided to students (such as weather maps, diagrams, and visualizations) or obtained through field observations or laboratory experiments. State Assessment Boundary: Specific names of cloud types or weather symbols used on weather maps are not expected in state assessment.
3-ESS2-2
8.MS-ESS2-6. Describe how interactions involving the ocean affect weather and climate on a regional scale, including the influence of the ocean temperature as mediated by energy input from the Sun and energy loss due to evaporation or redistribution via ocean currents. Clarification Statement: A regional scale includes a state or multi-state perspective. State Assessment Boundary: Koppen Climate Classification names are not expected in state assessment.
HS-ESS2-4
HS-ESS3-1
8.MS-ESS3-5. Examine and interpret data to describe the role that human activities have played in causing the rise in global temperatures over the past century. Clarification Statement: Examples of human activities include fossil fuel combustion, deforestation, and agricultural activity. Examples of evidence can include tables, graphs, and maps of global and regional temperatures, atmospheric levels of gases such as carbon dioxide and methane; and, the rates of human activities.
HS-LS2-7
HS-ESS2-6
HS-ESS3-2
3-LS4-3
3-LS3-2
8.MS-LS1-5. Construct an argument based on evidence for how environmental and genetic factors influence the growth of organisms. Clarification Statements: Examples of local environmental conditions could include availability of food, light, space, and water. Examples of genetic factors could include the genes responsible for size

with very large masses include the Earth, Sun, and other planets. State Assessment Boundary: Newton's law of Gravitation or Kepler's laws are not expected in state assessment.

HS-PS2-4.

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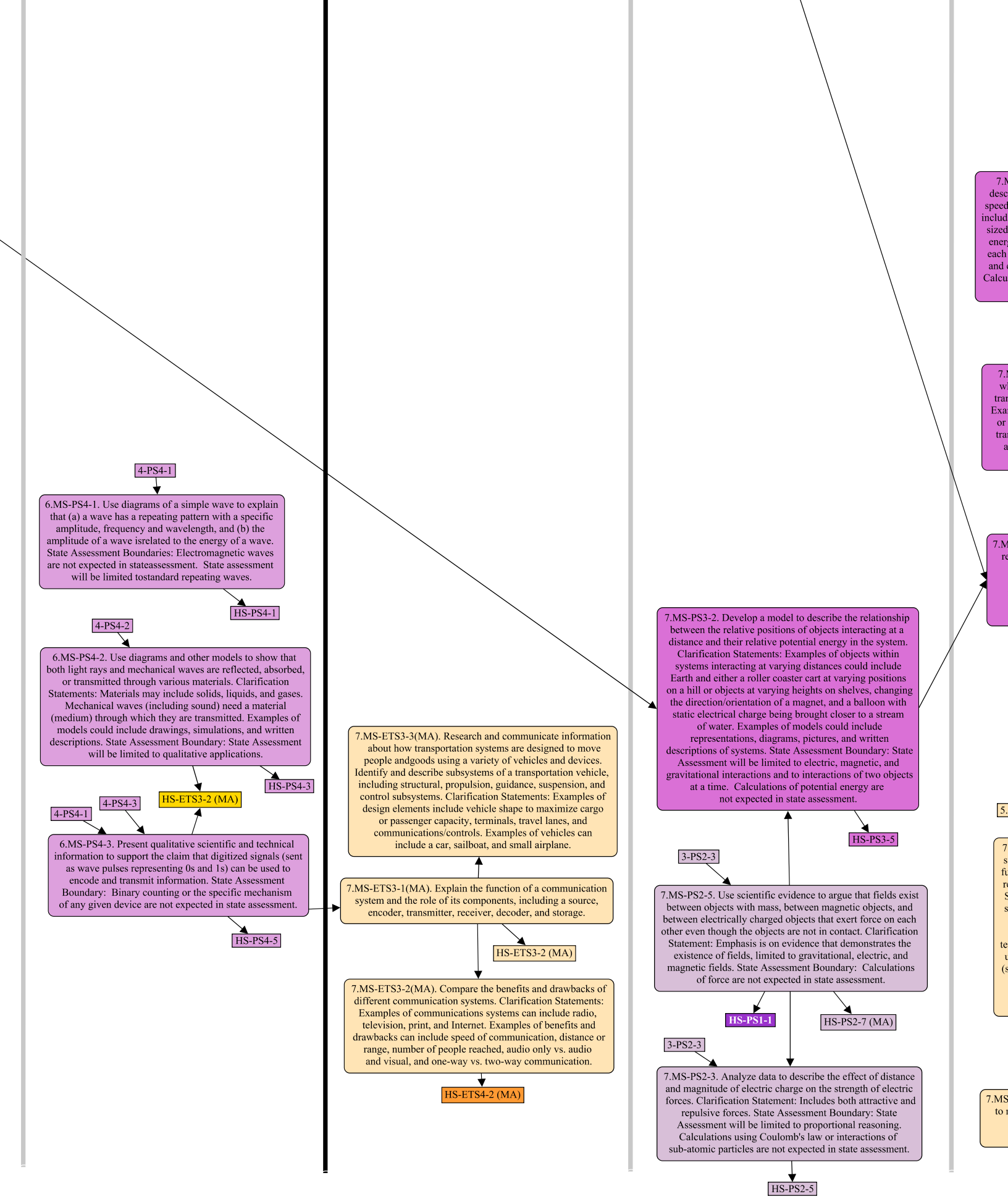
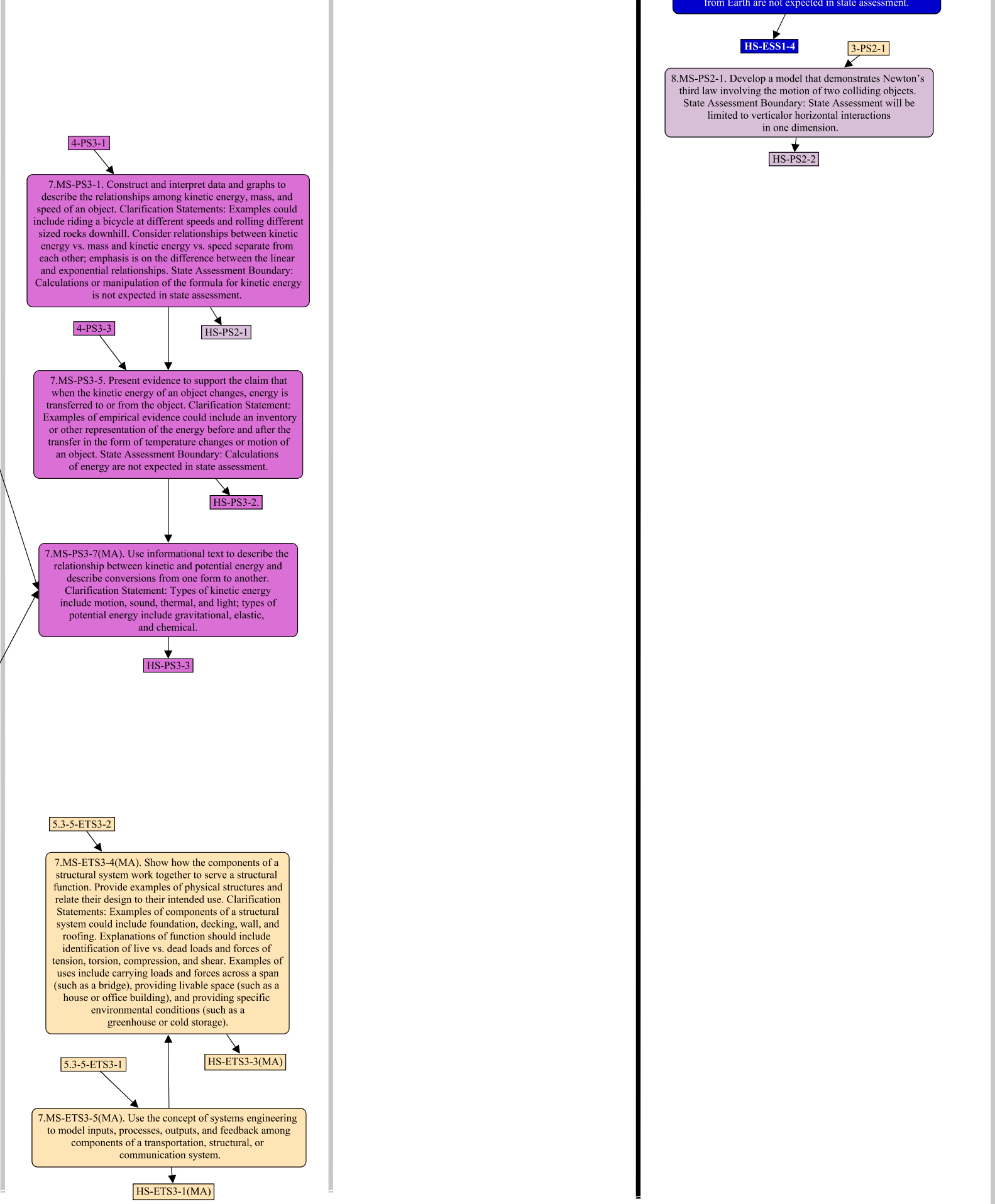
Massachusetts Department of Elementary and Secondary Education
June 2016

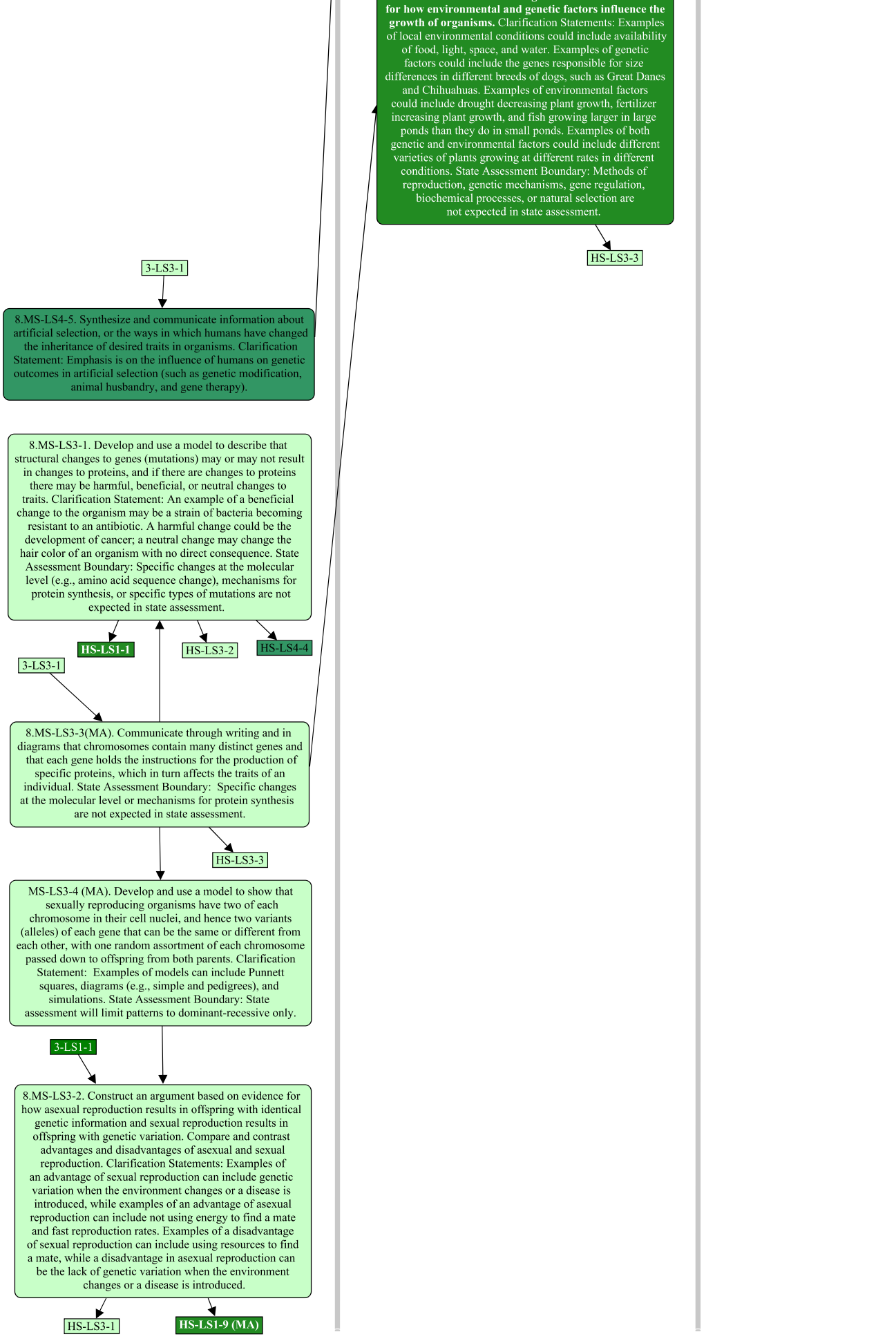
Grade 6 Quarter 1

Grade 6 Quarter 2

Grade 6 Quarter 3


4-PS4-1
6.MS-PS4-1. Use diagrams of a simple wave to explain that (a) a wave has a repeating pattern with a specific amplitude, frequency and wavelength, and (b) the amplitude of a wave isrelated to the energy of a wave. State Assessment Boundaries: Electromagnetic waves are not expected in stateassessment. State assessment will be limited tostandard repeating waves.
HS-PS4-1
4-PS4-2
6.MS-PS4-2. Use diagrams and other models to show that both light rays and mechanical waves are reflected, absorbed, or transmitted through various materials. Clarification Statements: Materials may include solids, liquids, and gases. Mechanical waves (including sound) need a material (medium) through which they are transmitted. Examples of models could include drawings, simulations, and written descriptions. State Assessment Boundary: State Assessment will be limited to qualitative applications.
HS-PS4-3
HS-ETS3-2 (MA)
4-PS4-1
4-PS4-3
6.MS-PS4-3. Present qualitative scientific and technical information to support the claim that digitized signals (sent as wave pulses representing 0s and 1s) can be used to encode and transmit information. State Assessment Boundary: Binary counting or the specific mechanism of any given device are not expected in state assessment.
HS-PS4-5
7.MS-ETS3-3(MA). Research and communicate information about how transportation systems are designed to move people andgoods using a variety of vehicles and devices. Identify and describe subsystems of a transportation vehicle, including structural, propulsion, guidance, suspension, and control subsystems. Clarification Statements: Examples of design elements include vehicle shape to maximize cargo or passenger capacity, terminals, travel lanes, and communications/controls. Examples of vehicles can include a car, sailboat, and small airplane.
7.MS-ETS3-1(MA). Explain the function of a communication system and the role of its components, including a source, encoder, transmitter, receiver, decoder, and storage.
HS-ETS3-2 (MA)
7.MS-ETS3-2(MA). Compare the benefits and drawbacks of different communication systems. Clarification Statements: Examples of communications systems can include radio, television, print, and Internet. Examples of benefits and drawbacks can include speed of communication, distance or range, number of people reached, audio only vs. audio and visual, and one-way vs. two-way communication.
HS-ETS4-2 (MA)
7.MS-PS3-2. Develop a model to describe the relationship between the relative positions of objects interacting at a distance and their relative potential energy in the system. Clarification Statements: Examples of objects within systems interacting at varying distances could include Earth and either a roller coaster cart at varying positions on a hill or objects at varying heights on shelves, changing the direction/orientation of a magnet, and a balloon with static electrical charge being brought closer to a stream of water. Examples of models could include representations, diagrams, pictures, and written descriptions of systems. State Assessment Boundary: State Assessment will be limited to electric, magnetic, and gravitational interactions and to interactions of two objects at a time. Calculations of potential energy are not expected in state assessment.
HS-PS3-5
3-PS2-3
7.MS-PS2-5. Use scientific evidence to argue that fields exist between objects with mass, between magnetic objects, and between electrically charged objects that exert force on each other even though the objects are not in contact. Clarification Statement: Emphasis is on evidence that demonstrates the existence of fields, limited to gravitational, electric, and magnetic fields. State Assessment Boundary: Calculations of force are not expected in state assessment.
HS-PS1-1
HS-PS2-7 (MA)
3-PS2-3
7.MS-PS2-3. Analyze data to describe the effect of distance and magnitude of electric charge on the strength of electric forces. Clarification Statement: Includes both attractive and repulsive forces. State Assessment Boundary: State Assessment will be limited to proportional reasoning. Calculations using Coulomb's law or interactions of sub-atomic particles are not expected in state assessment.
HS-PS2-5
Grade 6 Quarter 4
Grade 7 Quarter 1
Grade 7 Quarter 2


4-PS3-1
7.MS-PS3-1. Construct and interpret data and graphs to describe the relationships among kinetic energy, mass, and speed of an object. Clarification Statements: Examples could include riding a bicycle at different speeds and rolling different sized rocks downhill. Consider relationships between kinetic energy vs. mass and kinetic energy vs. speed separate from each other; emphasis is on the difference between the linear and exponential relationships. State Assessment Boundary: Calculations or manipulation of the formula for kinetic energy is not expected in state assessment.
4-PS3-3
HS-PS2-1
7.MS-PS3-5. Present evidence to support the claim that when the kinetic energy of an object changes, energy is transferred to or from the object. Clarification Statement: Examples of empirical evidence could include an inventory or other representation of the energy before and after the transfer in the form of temperature changes or motion of an object. State Assessment Boundary: Calculations of energy are not expected in state assessment.
HS-PS3-2.
7.MS-PS3-7(MA). Use informational text to describe the relationship between kinetic and potential energy and describe conversions from one form to another. Clarification Statement: Types of kinetic energy include motion, sound, thermal, and light; types of potential energy include gravitational, elastic, and chemical.
HS-PS3-3
5.3-5-ETS3-2
7.MS-ETS3-4(MA). Show how the components of a structural system work together to serve a structural function. Provide examples of physical structures and relate their design to their intended use. Clarification Statements: Examples of components of a structural system could include foundation, decking, wall, and roofing. Explanations of function should include identification of live vs. dead loads and forces of tension, torsion, compression, and shear. Examples of uses include carrying loads and forces across a span (such as a bridge), providing livable space (such as a house or office building), and providing specific environmental conditions (such as a greenhouse or cold storage).
HS-ETS3-3(MA)
5.3-5-ETS3-1
7.MS-ETS3-5(MA). Use the concept of systems engineering to model inputs, processes, outputs, and feedback among components of a transportation, structural, or communication system.
HS-ETS3-1(MA)
from Earth are not expected in state assessment.
HS-ESS1-4
3-PS2-1
8.MS-PS2-1. Develop a model that demonstrates Newton's third law involving the motion of two colliding objects. State Assessment Boundary: State Assessment will be limited to verticalor horizontal interactions in one dimension.
HS-PS2-2
Grade 7 Quarter 3
Grade 7 Quarter 4
Grade 8 Quarter 1


for how environmental and genetic factors influence the growth of organisms. Clarification Statements: Examples of local environmental conditions could include availability of food, light, space, and water. Examples of genetic factors could include the genes responsible for size differences in different breeds of dogs, such as Great Danes and Chihuahuas. Examples of environmental factors could include drought decreasing plant growth, fertilizer increasing plant growth, and fish growing larger in large ponds than they do in small ponds. Examples of both genetic and environmental factors could include different varieties of plants growing at different rates in different conditions. State Assessment Boundary: Methods of reproduction, genetic mechanisms, gene regulation, biochemical processes, or natural selection are not expected in state assessment.
HS-LS3-3
3-LS3-1
8.MS-LS4-5. Synthesize and communicate information about artificial selection, or the ways in which humans have changed the inheritance of desired traits in organisms. Clarification Statement: Emphasis is on the influence of humans on genetic outcomes in artificial selection (such as genetic modification, animal husbandry, and gene therapy).
8.MS-LS3-1. Develop and use a model to describe that structural changes to genes (mutations) may or may not result in changes to proteins, and if there are changes to proteins there may be harmful, beneficial, or neutral changes to traits. Clarification Statement: An example of a beneficial change to the organism may be a strain of bacteria becoming resistant to an antibiotic. A harmful change could be the development of cancer; a neutral change may change the hair color of an organism with no direct consequence. State Assessment Boundary: Specific changes at the molecular level (e.g., amino acid sequence change), mechanisms for protein synthesis, or specific types of mutations are not expected in state assessment.
HS-LS1-1
HS-LS3-2
HS-LS4-4
3-LS3-1
8.MS-LS3-3(MA). Communicate through writing and in diagrams that chromosomes contain many distinct genes and that each gene holds the instructions for the production of specific proteins, which in turn affects the traits of an individual. State Assessment Boundary: Specific changes at the molecular level or mechanisms for protein synthesis are not expected in state assessment.
HS-LS3-3
MS-LS3-4 (MA). Develop and use a model to show that sexually reproducing organisms have two of each chromosome in their cell nuclei, and hence two variants (alleles) of each gene that can be the same or different from each other, with one random assortment of each chromosome passed down to offspring from both parents. Clarification Statement: Examples of models can include Punnett squares, diagrams (e.g., simple and pedigrees), and simulations. State Assessment Boundary: State assessment will limit patterns to dominant-recessive only.
3-LS1-1
8.MS-LS3-2. Construct an argument based on evidence for how asexual reproduction results in offspring with identical genetic information and sexual reproduction results in offspring with genetic variation. Compare and contrast advantages and disadvantages of asexual and sexual reproduction. Clarification Statements: Examples of an advantage of sexual reproduction can include genetic variation when the environment changes or a disease is introduced, while examples of an advantage of asexual reproduction can include not using energy to find a mate and fast reproduction rates. Examples of a disadvantage of sexual reproduction can include using resources to find a mate, while a disadvantage in asexual reproduction can be the lack of genetic variation when the environment changes or a disease is introduced.
HS-LS3-1
HS-LS1-9 (MA)
Grade 8 Quarter 2
Grade 8 Quarter 3
Grade 8 Quarter 4