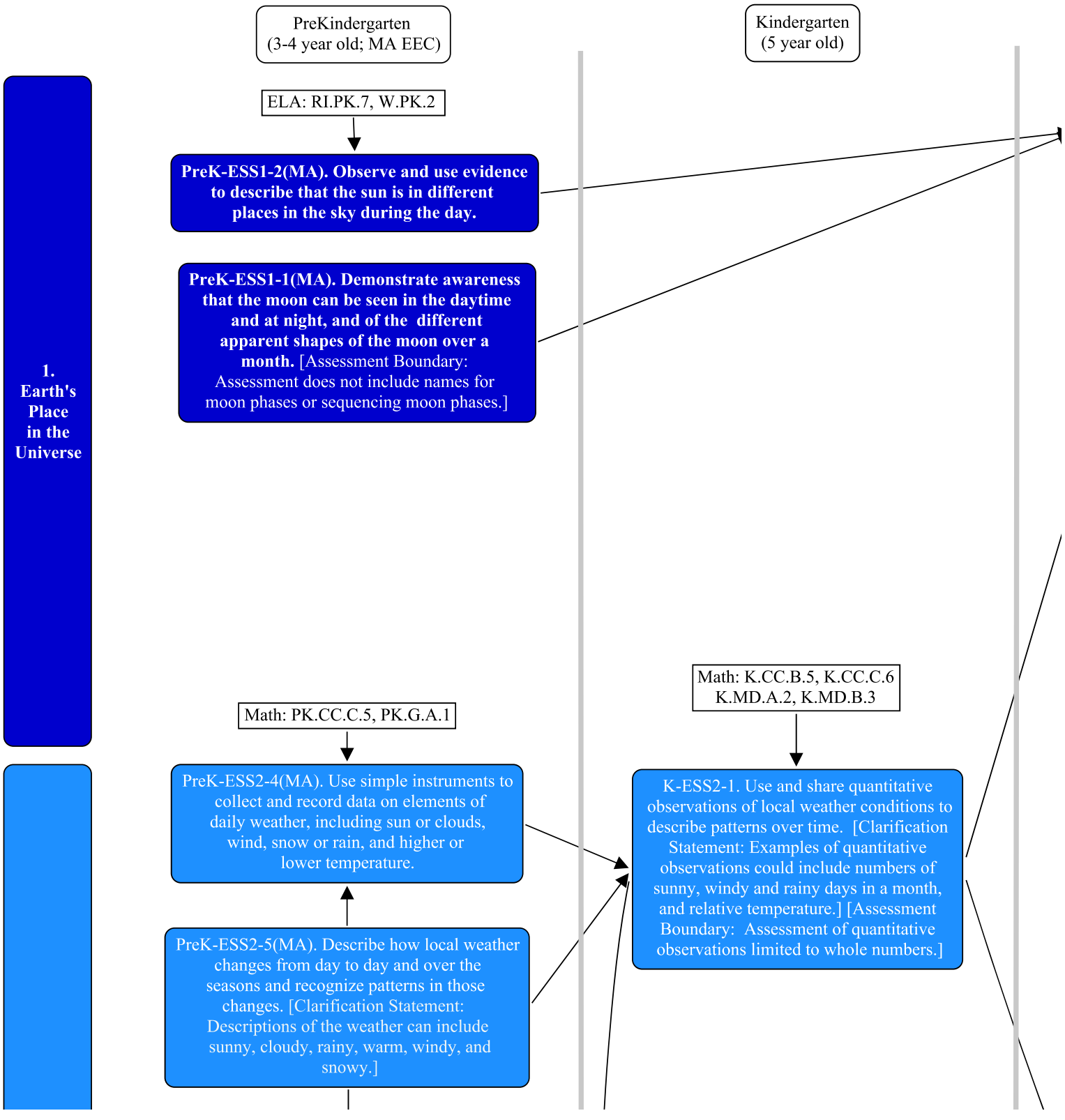
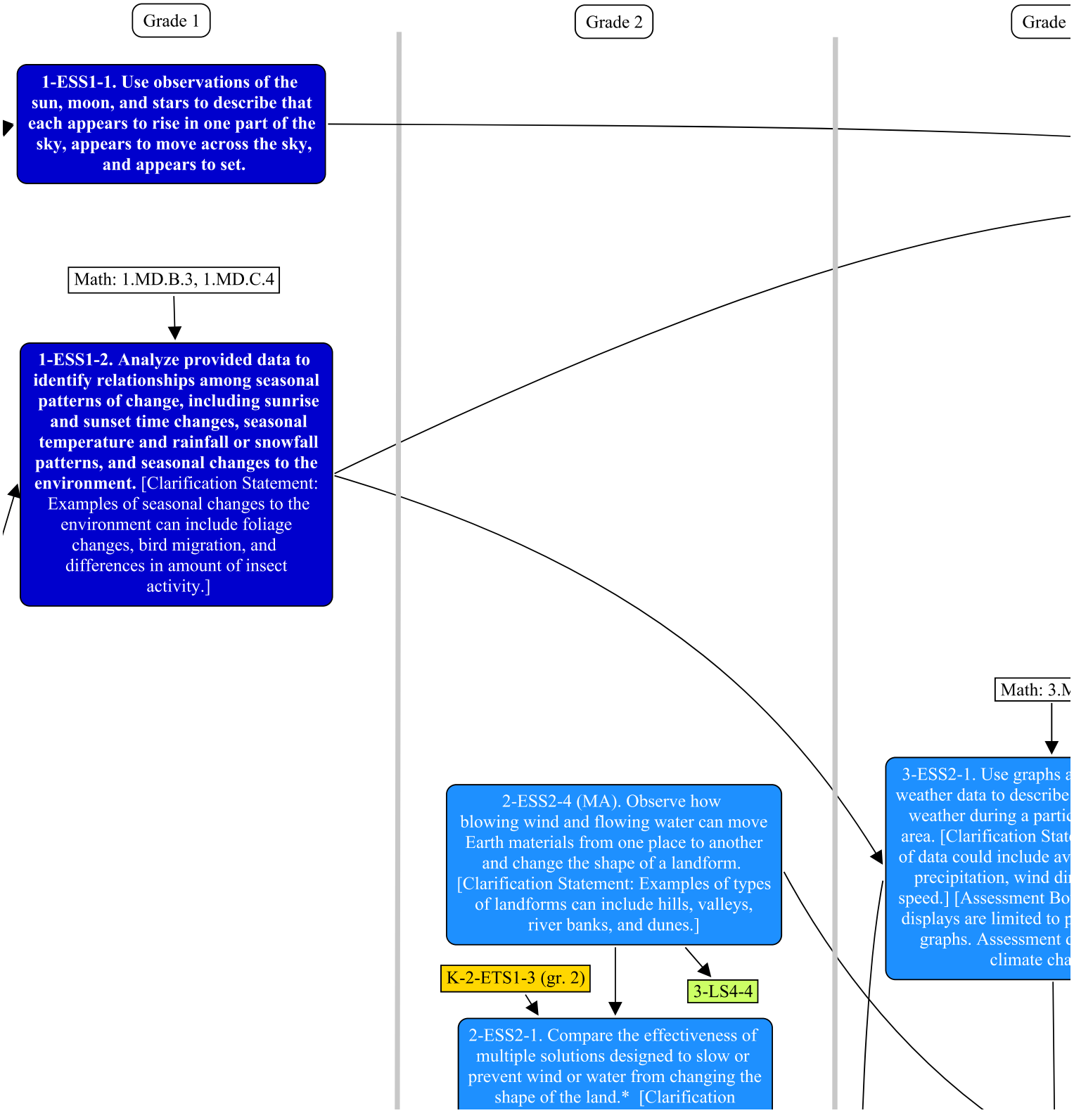
MA Draft Revi

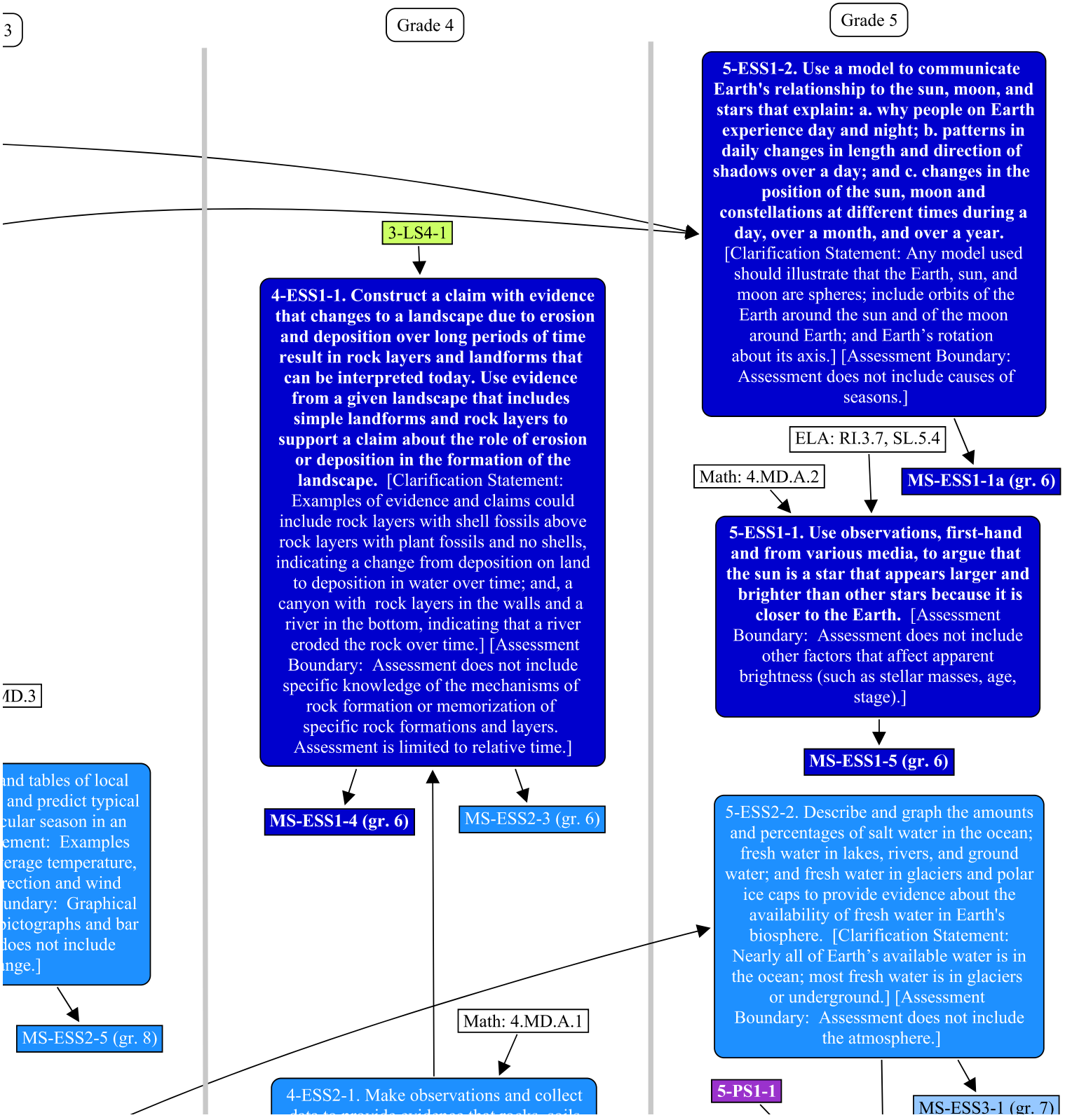


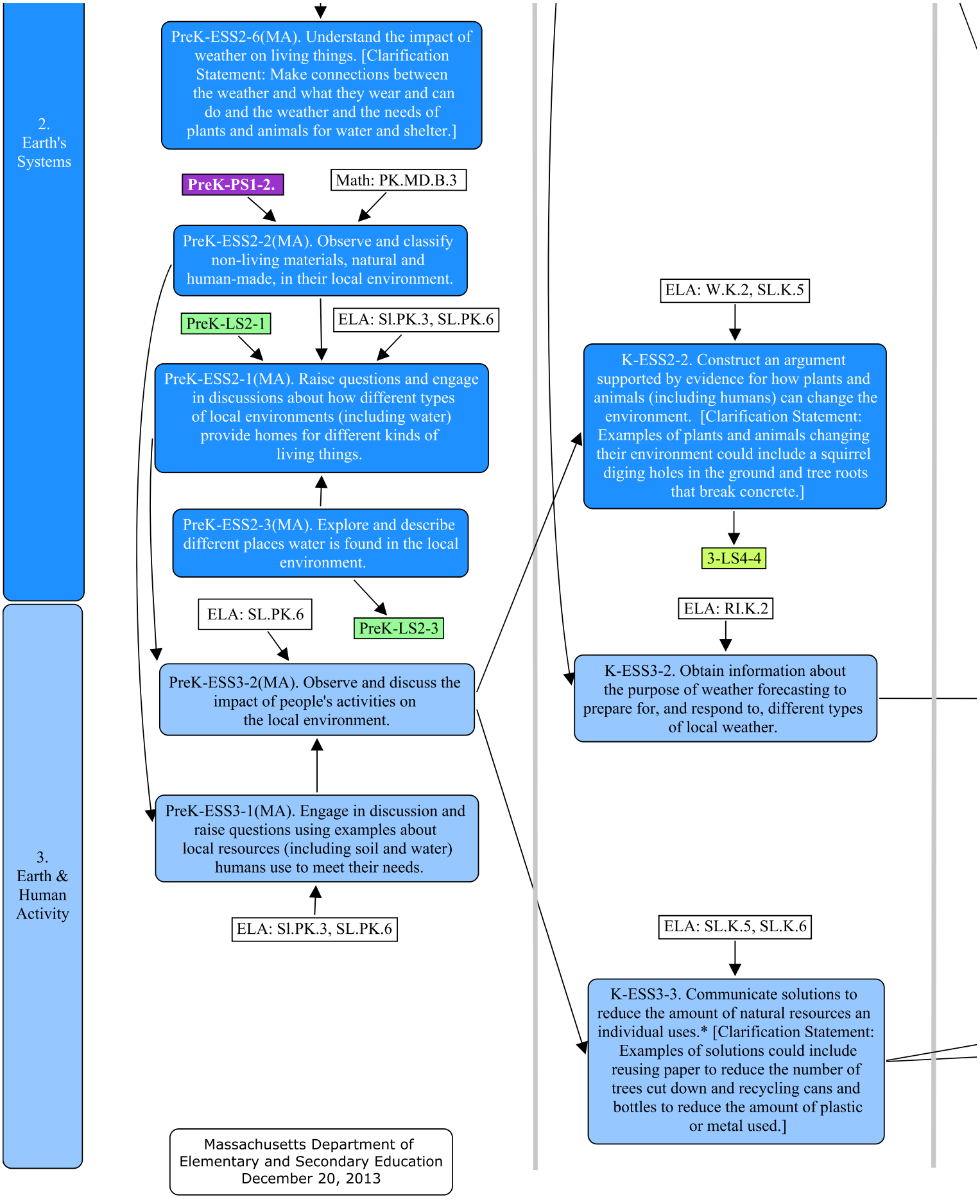
sed PreK-5 *Earth & Space Science* Stran

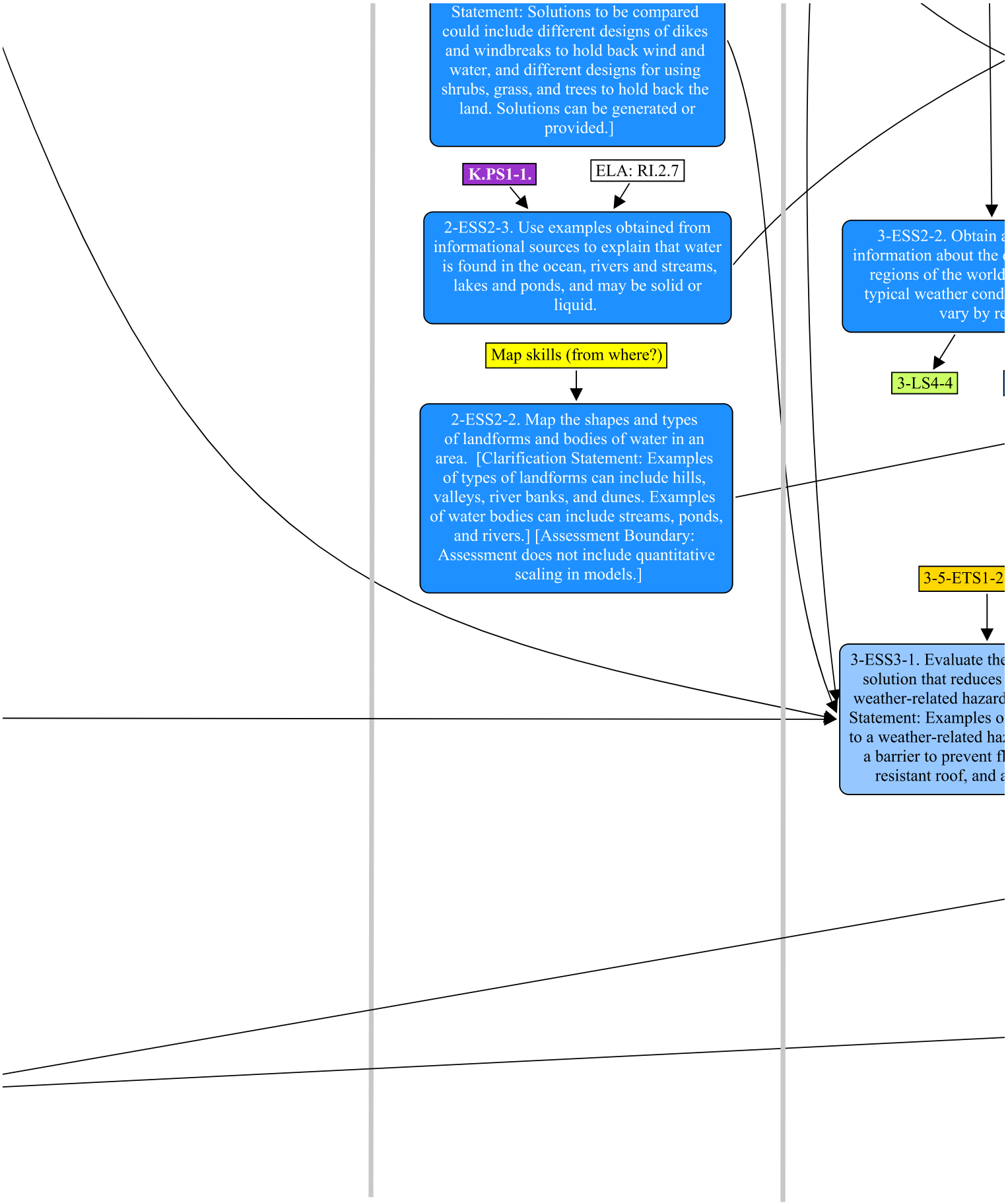
Based on *A Framework for K-12 Science Education* (NRC, 2012) and adapted from the *Next Generation Science Standards* (2013)
Please direct comments, suggested edits, and questions to: mathsciencetech@doe.mass.edu.
The standards and strand maps are available at: www.doe.mass.edu/stem/review.html
(*) denotes integration of technology/engineering through a practice or core idea.

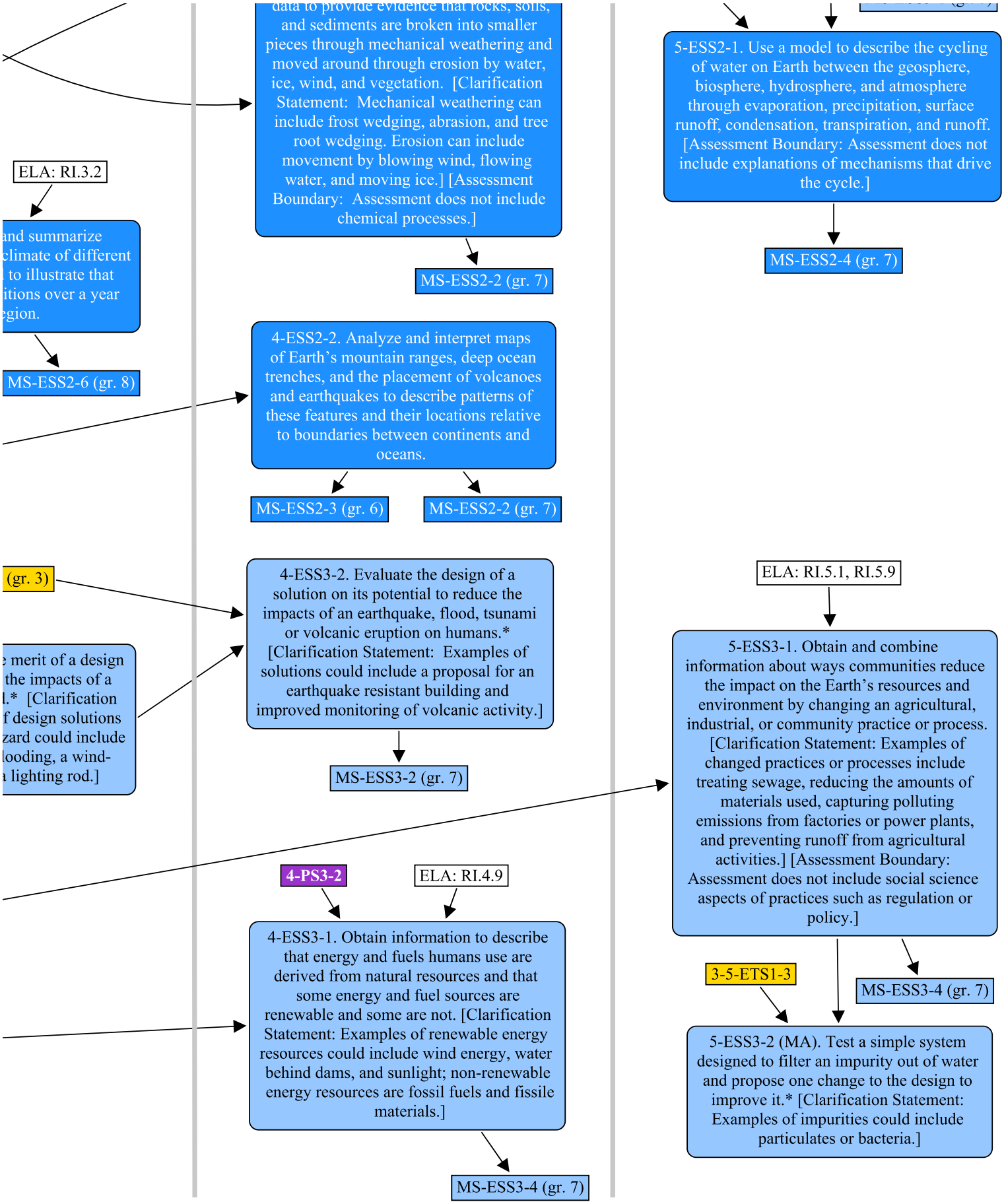


d Map (12/20/13)


3
Grade 4
Grade 5
5-ESS1-2. Use a model to communicate Earth's relationship to the sun, moon, and stars that explain: a. why people on Earth experience day and night; b. patterns in daily changes in length and direction of shadows over a day; and c. changes in the position of the sun, moon and constellations at different times during a day, over a month, and over a year. [Clarification Statement: Any model used should illustrate that the Earth, sun, and moon are spheres; include orbits of the Earth around the sun and of the moon around Earth; and Earth's rotation about its axis.] [Assessment Boundary: Assessment does not include causes of seasons.]
3-LS4-1
4-ESS1-1. Construct a claim with evidence that changes to a landscape due to erosion and deposition over long periods of time result in rock layers and landforms that can be interpreted today. Use evidence from a given landscape that includes simple landforms and rock layers to support a claim about the role of erosion or deposition in the formation of the landscape. [Clarification Statement: Examples of evidence and claims could include rock layers with shell fossils above rock layers with plant fossils and no shells, indicating a change from deposition on land to deposition in water over time; and, a canyon with rock layers in the walls and a river in the bottom, indicating that a river eroded the rock over time.] [Assessment Boundary: Assessment does not include specific knowledge of the mechanisms of rock formation or memorization of specific rock formations and layers. Assessment is limited to relative time.]
ELA: RI.3.7, SL.5.4
Math: 4.MD.A.2
MS-ESS1-1a (gr. 6)
5-ESS1-1. Use observations, first-hand and from various media, to argue that the sun is a star that appears larger and brighter than other stars because it is closer to the Earth. [Assessment Boundary: Assessment does not include other factors that affect apparent brightness (such as stellar masses, age, stage).]
MS-ESS1-5 (gr. 6)
MD.3
nd tables of local and predict typical cular season in an ement: Examples erage temperature, rection and wind undary: Graphical ictographs and bar loes not include nge.]
MS-ESS1-4 (gr. 6)
MS-ESS2-3 (gr. 6)
5-ESS2-2. Describe and graph the amounts and percentages of salt water in the ocean; fresh water in lakes, rivers, and ground water; and fresh water in glaciers and polar ice caps to provide evidence about the availability of fresh water in Earth's biosphere. [Clarification Statement: Nearly all of Earth's available water is in the ocean; most fresh water is in glaciers or underground.] [Assessment Boundary: Assessment does not include the atmosphere.]
MS-ESS2-5 (gr. 8)
Math: 4.MD.A.1
4-ESS2-1. Make observations and collect
5-PS1-1
MS-ESS3-1 (gr. 7)


2. Earth's Systems
3. Earth & Human Activity
PreK-ESS2-6(MA). Understand the impact of weather on living things. [Clarification Statement: Make connections between the weather and what they wear and can do and the weather and the needs of plants and animals for water and shelter.]
PreK-PS1-2.
Math: PK.MD.B.3
PreK-ESS2-2(MA). Observe and classify non-living materials, natural and human-made, in their local environment.
PreK-LS2-1
ELA: Sl.PK.3, SL.PK.6
PreK-ESS2-1(MA). Raise questions and engage in discussions about how different types of local environments (including water) provide homes for different kinds of living things.
PreK-ESS2-3(MA). Explore and describe different places water is found in the local environment.
ELA: SL.PK.6
PreK-LS2-3
PreK-ESS3-2(MA). Observe and discuss the impact of people's activities on the local environment.
PreK-ESS3-1(MA). Engage in discussion and raise questions using examples about local resources (including soil and water) humans use to meet their needs.
ELA: Sl.PK.3, SL.PK.6
ELA: W.K.2, SL.K.5
K-ESS2-2. Construct an argument supported by evidence for how plants and animals (including humans) can change the environment. [Clarification Statement: Examples of plants and animals changing their environment could include a squirrel diging holes in the ground and tree roots that break concrete.]
3-LS4-4
ELA: RI.K.2
K-ESS3-2. Obtain information about the purpose of weather forecasting to prepare for, and respond to, different types of local weather.
ELA: SL.K.5, SL.K.6
K-ESS3-3. Communicate solutions to reduce the amount of natural resources an individual uses.* [Clarification Statement: Examples of solutions could include reusing paper to reduce the number of trees cut down and recycling cans and bottles to reduce the amount of plastic or metal used.]


Statement: Solutions to be compared could include different designs of dikes and windbreaks to hold back wind and water, and different designs for using shrubs, grass, and trees to hold back the land. Solutions can be generated or provided.]
K.PS1-1.
ELA: RI.2.7
2-ESS2-3. Use examples obtained from informational sources to explain that water is found in the ocean, rivers and streams, lakes and ponds, and may be solid or liquid.
3-ESS2-2. Obtain a
information about the
regions of the world
typical weather cond
vary by re
Map skills (from where?)
3-LS4-4
2-ESS2-2. Map the shapes and types of landforms and bodies of water in an area. [Clarification Statement: Examples of types of landforms can include hills, valleys, river banks, and dunes. Examples of water bodies can include streams, ponds, and rivers.] [Assessment Boundary: Assessment does not include quantitative scaling in models.]
3-5-ETS1-2
3-ESS3-1. Evaluate the
solution that reduces
weather-related hazard
Statement: Examples o
to a weather-related haz
a barrier to prevent fl
resistant roof, and a


data to provide evidence that rocks, soils, and sediments are broken into smaller pieces through mechanical weathering and moved around through erosion by water, ice, wind, and vegetation. [Clarification Statement: Mechanical weathering can include frost wedging, abrasion, and tree root wedging. Erosion can include movement by blowing wind, flowing water, and moving ice.] [Assessment Boundary: Assessment does not include chemical processes.]
MS-ESS2-2 (gr. 7)
5-ESS2-1. Use a model to describe the cycling of water on Earth between the geosphere, biosphere, hydrosphere, and atmosphere through evaporation, precipitation, surface runoff, condensation, transpiration, and runoff. [Assessment Boundary: Assessment does not include explanations of mechanisms that drive the cycle.]
MS-ESS2-4 (gr. 7)
ELA: RI.3.2
and summarize climate of different to illustrate that itions over a year egion.
MS-ESS2-6 (gr. 8)
4-ESS2-2. Analyze and interpret maps of Earth's mountain ranges, deep ocean trenches, and the placement of volcanoes and earthquakes to describe patterns of these features and their locations relative to boundaries between continents and oceans.
MS-ESS2-3 (gr. 6)
MS-ESS2-2 (gr. 7)
(gr. 3)
merit of a design the impacts of a .* [Clarification f design solutions zard could include looding, a wind- a lighting rod.]
4-ESS3-2. Evaluate the design of a solution on its potential to reduce the impacts of an earthquake, flood, tsunami or volcanic eruption on humans.* [Clarification Statement: Examples of solutions could include a proposal for an earthquake resistant building and improved monitoring of volcanic activity.]
MS-ESS3-2 (gr. 7)
ELA: RI.5.1, RI.5.9
5-ESS3-1. Obtain and combine information about ways communities reduce the impact on the Earth's resources and environment by changing an agricultural, industrial, or community practice or process. [Clarification Statement: Examples of changed practices or processes include treating sewage, reducing the amounts of materials used, capturing polluting emissions from factories or power plants, and preventing runoff from agricultural activities.] [Assessment Boundary: Assessment does not include social science aspects of practices such as regulation or policy.]
4-PS3-2
ELA: RI.4.9
4-ESS3-1. Obtain information to describe that energy and fuels humans use are derived from natural resources and that some energy and fuel sources are renewable and some are not. [Clarification Statement: Examples of renewable energy resources could include wind energy, water behind dams, and sunlight; non-renewable energy resources are fossil fuels and fissile materials.]
MS-ESS3-4 (gr. 7)
3-5-ETS1-3
MS-ESS3-4 (gr. 7)
5-ESS3-2 (MA). Test a simple system designed to filter an impurity out of water and propose one change to the design to improve it.* [Clarification Statement: Examples of impurities could include particulates or bacteria.]