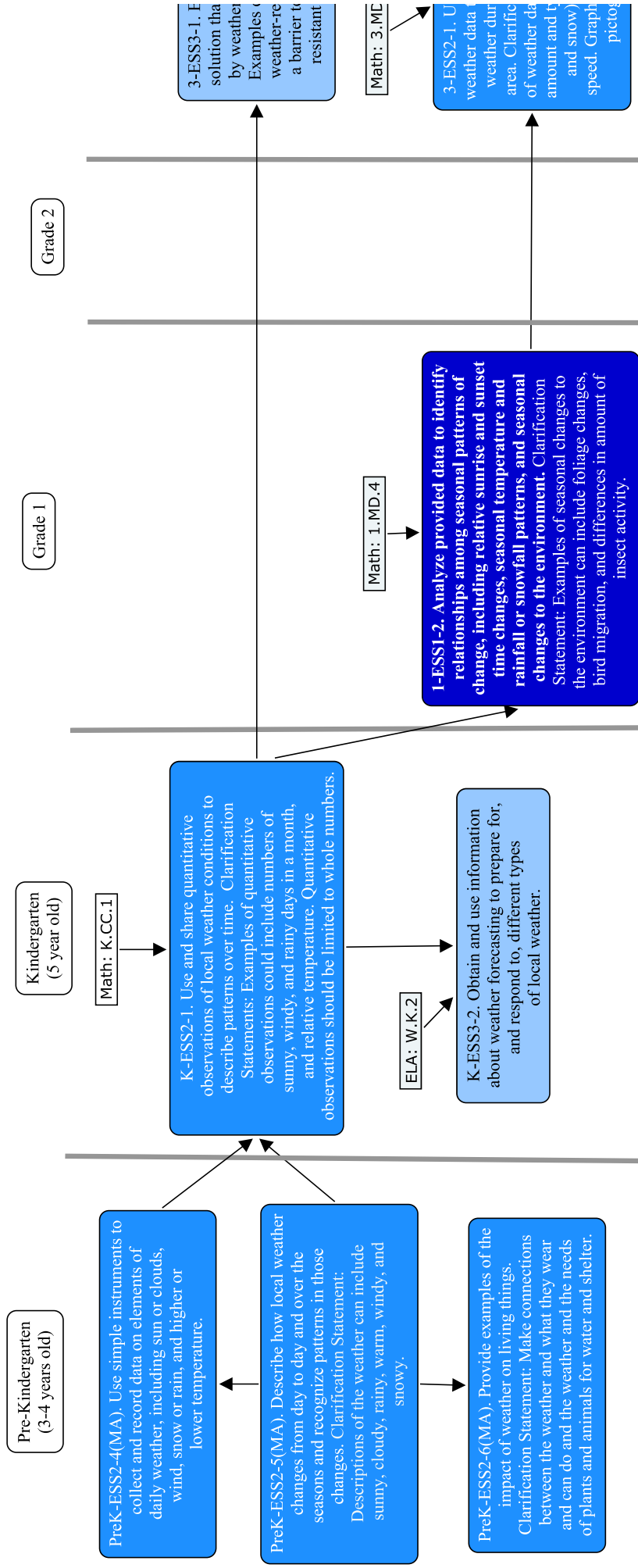


MA 2016 STI

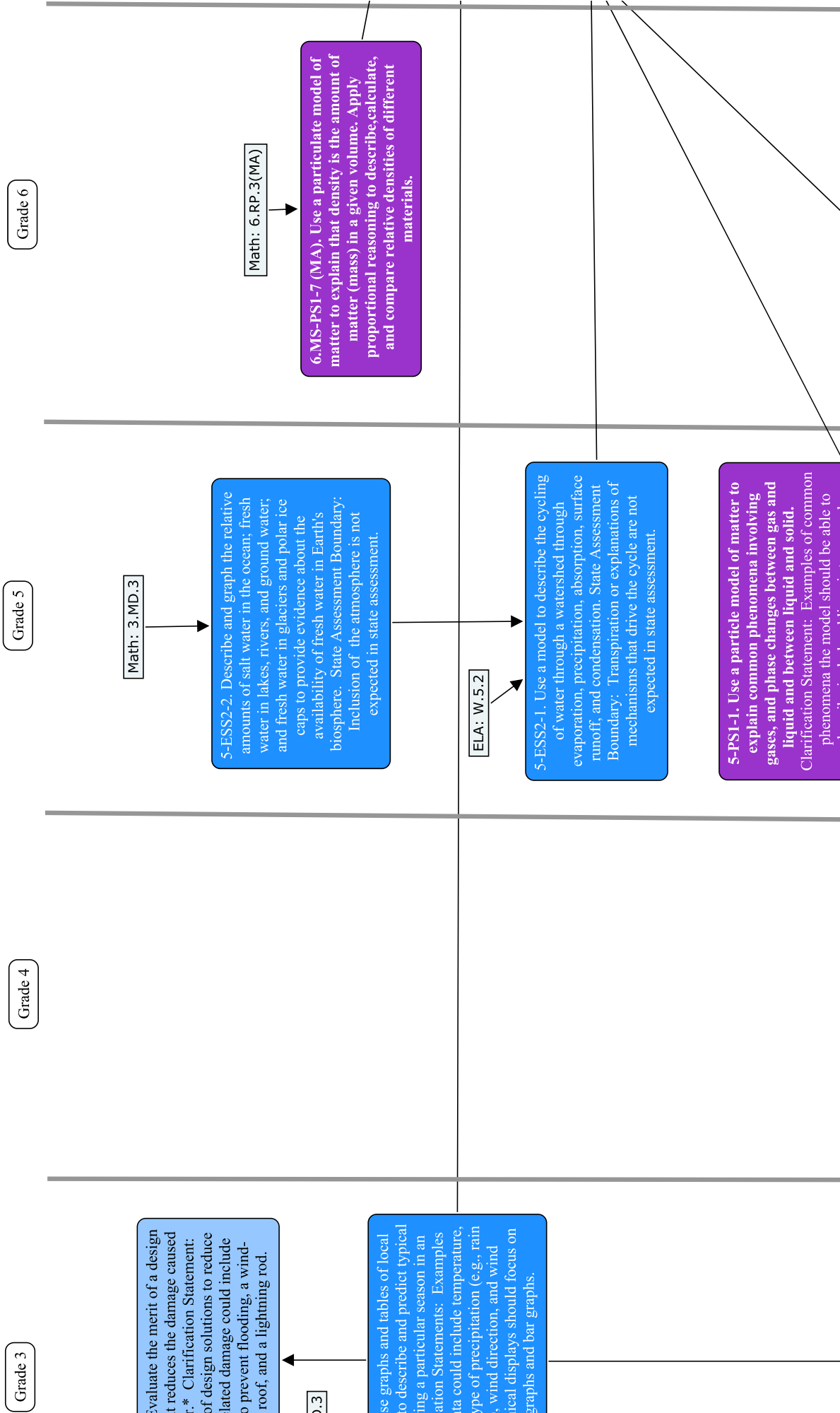


Topic Strand Map - WEATHER & CLIMATE (April 2016)

Please direct comments, suggested edits, and questions to: mathsciencetechn@doe.mass.edu.

The standards and strand maps are available at: www.doe.mass.edu/sci/review.html

(*) denotes integration of technology/engineering through a practice or core idea.





Grade 7

Math: 7.RP.2

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.

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.

Grade 8

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.

8.MS-ESS2-5. Interpret basic weather data to identify patterns in air mass interactions and the relationship of those patterns to local weather. Clarification Statements: 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.

High School

Math: Alg 1 FIF.4

ELA: 9-10.WHST.2

HS-ESS2-4. Use a model to describe how variations in the flow of energy into and out of Earth's systems over different time scales result in changes in climate. Analyze and interpret data to explain that long-term changes in Earth's tilt and orbit result in cycles of climate change such as Ice Ages. Clarification Statement: Examples of the causes of climate change differ by timescale: large volcanic eruption, ocean circulation ten to hundreds of years; changes in human activity, ocean circulation, and solar output over of ten to hundreds years; changes to Earth's orbit and the orientation of its axis over ten to hundreds of thousands of years; and, long-term changes in atmospheric composition over ten to hundreds of millions of years. State Assessment Boundary: Changes in climate will be limited to changes in surface temperatures, precipitation patterns, glacial ice volumes, sea levels, and biosphere distribution in state assessment.

ELA: 9-10.WHST.1

HS-ESS3-1. Construct an explanation based on evidence for how the availability of key natural resources and changes due to variations in climate have influenced human activity. Clarification Statements: Examples of key natural resources include access to fresh water (such as rivers, lakes, and groundwater), regions of fertile soils (such as river deltas), high concentrations of minerals and fossil fuels, and biotic resources (such as fisheries and forests). Examples of changes due to variations in climate include changes to sea level and regional patterns of temperature and precipitation.

HS-LS1-5. Use a model to illustrate how photosynthesis uses light energy to transform water and carbon dioxide into oxygen and chemical energy stored in the bonds of sugars and other carbohydrates. Clarification Statements: Emphasis is on illustrating inputs and outputs of matter and the transfer and transformation of energy in photosynthesis by plants and other photosynthesizing

ELA: W.1



3-ESS2-2. Obtain and analyze information about the climate of the world to ill conditions. Clarification: Information (average temperature, average wind speed) for different Boundary: 7 change is not

3-LS4-4. Analyze about changes the change organisms that and reproduction Environment changes to land climate, air Change could range decade. While changes are on a sin

