(A) Scientific practices. Students should be able to ask questions, plan and conduct investigations to answer questions, and explain phenomena using appropriate tools and models.

(B) Engineering practices. Students should be able to identify problems and design solutions using appropriate tools and models.

(5) Science and social ethics. Scientific decision making is a way of answering questions about the natural world involving its own set of ethical standards about how the process of science should be carried out. Students should be able to distinguish between scientific decision-making methods (scientific methods) and ethical and social decisions that involve science (the application of scientific information).

(6) Science consists of recurring themes and making connections between overarching concepts. Recurring themes include systems, models, and patterns. All systems have basic properties that can be described in space, time, energy, and matter. Change and constancy occur in systems as patterns and can be observed, measured, and modeled. These patterns help to make predictions that can be scientifically tested, while models allow for boundary specification and provide tools for understanding the ideas presented. Students should analyze a system in terms of its components and how these components relate to each other, to the whole, and to the external environment.

(7) Statements containing the word "including" reference content that must be mastered, while those containing the phrase "such as" are intended as possible illustrative examples.

(b) Knowledge and Skills Statements

(1) Scientific and engineering practices. The student, for at least 40% of instructional time, asks questions, identifies problems, and plans and safely conducts classroom, laboratory, and field investigations to explain phenomena or design solutions using appropriate tools and models. The student is expected to:

(A) ask questions and define problems based on observations or information from

Breakouts

(i) organize quantitative data using probeware, spreadsheets, lab notebooks or journals, models, diagrams, graphs paper, computers, or cellphone applications

(ii) organize qualitative data using probeware, spreadsheets, lab notebooks or journals, models, diagrams, graphs paper, computers, or cellphone applications

(iii) relate the impact of past research on scientific thought, including contributions of diverse scientists as related to the content

(iv) relate the impact of past research on society, including research methodology

(v) relate the impact of past research on society, including cost-benefit analysis

(vi) relate the impact of past research on society, including contributions of diverse scientists as related to the content

(vii) relate the impact of current research on scientific thought, including research methodology

(viii) relate the impact of current research on scientific thought, including cost-benefit analysis

(ix) relate the impact of current research on scientific thought, including contributions of diverse scientists as related to the content

(x) relate the impact of current research on society, including research methodology

(xi) relate the impact of current research on society, including cost-benefit analysis

(xii) relate the impact of current research on society, including contributions of diverse scientists as related to the content

(C) research and explore resources such as museums, planetariums, observatories, libraries, professional organizations, private companies, online platforms, and mentors employed in a science, technology, engineering, and mathematics (STEM) field in order to investigate STEM careers.

Breakouts

(i) research STEM careers

(ii) explore resources in order to investigate STEM careers

(5) The student understands how the properties of water build the foundation of aquatic ecosystems. The student is expected to:

(A) describe how the shape and polarity of the water molecule make it a "universal solvent" in aquatic systems;

Breakouts

(i) describe how the shape of the water molecule make it a "universal solvent" in aquatic systems

(ii) describe how the polarity of the water molecule make it a "universal solvent" in aquatic systems

(B) identify how aquatic ecosystems are affected by water's properties of adhesion, cohesion, surface tension, heat capacity, an37708(i)-1.5 (o)-4 (n)-0.6(, )]T4(o)-4 (n)- an37708(i)-1.5 (o)-4 (n)-0.6(, )]T4(o5a-ey)

(A) identify how energy flows and matter cycles through both freshwater and marine aquatic

(8) The student conducts short-

Breakouts

(i) identify the role of carbon cycles in an aquatic environment, including upwellings

(ii) identify the role of carbon cycles in an aquatic environment, including turnovers

(iii) identify the role of nitrogen cycles in an aquatic environment, including upwellings

(iv) identify the role of nitrogen cycles in an aquatic environment, including turnovers

(v) identify the role of water cycles in an aquatic environment, including upwellings

(vi) identify the role of water cycles in an aquatic environment, including turnovers

(vii) identify the role of nutrient cycles in an aquatic environment, including upwellings

(viii) identify the role of nutrient cycles in an aquatic environment, including turnovers

(B) examine the interrelationships between aquatic systems and climate and weather, including El Niño and La Niña, currents, and hurricanes; and

Breakouts

(i) examine the interrelationships between aquatic systems and climate and weather, including El Niño

(ii) examine the interrelationships between aquatic systems and climate and weather, including La Niña

(iii) examine the interrelationships between aquatic systems and climate and weather, including currents

(iv) examine the interrelationships between aquatic systems and climate and weather, including hurricanes

(C) explain how tidal cycles influence intertidal ecology.

Breakouts

(i) explain how tidal cycles influence intertidal ecology

(10) The student knows the origin and potenain(C)

Breakouts

(i) identify the major properties of different marine life zones

(ii) identify the major properties of different freshwater life zones

(iii) identify the major components of different mariner life zones

(iv) identify the major components of different freshwater life zones

(13) The student knows environmental adaptations of aquatic organisms. The student st3(t38.24 0 TdC07(n)ffeTw 3(n)c(62]T(

(vii) predict effects of physical changes due to humans on the nonliving components of an aquatic ecosystem

(viii) predict effects of thermal changes due to humans on the nonliving components of