The State Board of Education (SBOE) adopts an amendment to §112.26, concerning Grade 6 science. The amendment is adopted without changes to the proposed text as published in the December 22, 2023 issue of the *Texas Register* (48 TexReg 7738) and will not be republished. The adopted amendment corrects punctuation errors in the student expectation in §112.26(b)(11)(A).

REASONED JUSTIFICATION: In accordance with statutory requirements that the SBOE by rule identify the essential knowledge and skills of each subject in the required curriculum, the SBOE follows a board-approved cycle to review and revise the essential knowledge and skills for each subject.

At the September 2019 meeting, SBOE members were asked to designate content advisors for the review and revision of the science Texas Essential Knowledge and Skills (TEKS). In December 2019, applications to serve on science TEKS review work groups were posted on the Texas Education Agency (TEA) website. Additionally, in December 2019, TEA distributed a survey to collect information from educators regarding the review and revision of the science TEKS. TEA staff provided applications for the science review work groups to SBOE members on a monthly basis from December 2019 to June 2020 and in September, October, and December 2020. At the January 2020 SBOE meeting, the SBOE provided specific guidance for the TEKS review work groups.

Also in January 2020, science TEKS review content advisors met in a face-to-face meeting to develop consensus recommendations regarding revisions to the science TEKS to share with future work groups. At that time, the content advisors met with representatives from Work Group A to discuss the consensus recommendations. Work Group A convened in February 2020 to review survey results, content advisor consensus recommendations, and the SBOE's guidance to work groups to develop recommendations for how science TEKS review work groups can address these areas. Work Group B was convened virtually in June 2020 to develop recommendations for four high school science courses: Biology, Chemistry, Integrated Physics and Chemistry, and Physics. In November 2020, the SBOE approved for second reading and final adoption proposed new §§112.41-112.45 for implementation beginning in the 2023-2024 school year.

Work Group D was convened for monthly meetings from November 2020-February 2021 to develop recommendations for TEKS for five additional high school science courses: Aquatic Science, Astronomy, Earth and Space Science, Environmental Systems, and a new course Specialized Topics in Science. In June 2021, the board gave final approval to the additional high school science courses. Specialized Topics in Science was approved for implementation beginning in the 2022-2023 school year. Aquatic Science, Astronomy, Earth and Space Science, and Environmental Systems were approved for implementation beginning in the 2024-2025 school year.

Between August and November 2020, Work Group C convened for a series of virtual meetings to develop recommendations for the Grades 6-8 science TEKS. Work Group E was convened for monthly meetings between January and March 2021 to develop recommendations for the science TEKS for Kindergarten-Grade 5. Work Groups C and E were reconvened in May and June 2021 to address public feedback and revise their draft recommendations. Work Group F was convened for a series of virtual meetings in July 2021 to address SBOE feedback provided at the April and June 2021 SBOE meetings, vertically align the elementary and middle school standards, meet with content advisors, and finalize the draft recommendations for the Kindergarten-Grade 8 TEKS for science. At the September 2021 SBOE meeting, the board approved for first reading and filing authorization proposed new TEKS for Kindergarten-Grade 5 science. At the November 2021 SBOE meeting, the board approved for second reading and final adoption proposed new 19 TAC §§112.1-112.7 and 112.25-112.28.

Following adoption of the revised standards, an error was discovered in one Grade 6 student expectation. An additional comma changed the intended meaning of the student expectation. The adopted amendment removes the comma and makes a technical edit to punctuation at the end of the student expectation.

The SBOE approved the amendment for first reading and filing authorization at its November 17, 2023 meeting and for second reading and final adoption at its February 2, 2024 meeting.

In accordance with Texas Education Code, §7.102(f), the SBOE approved the amendment for adoption by a vote of two-thirds of its members to specify an effective date earlier than the beginning of the 2024-2025 school year. The earlier effective date would correct an error prior to the implementation of the new standards in the 2024-2025 school year. The effective date is 20 days after filing as adopted with the Texas Register.

SUMMARY OF COMMENTS AND RESPONSES: The public comment period on the proposal began December 22, 2023, and ended at 5:00 p.m. on January 22, 2024. The SBOE also provided an opportunity for registered oral and written comments at its January-February 2024 meeting in accordance with the SBOE board operating policies and procedures. No public comments were received.

STATUTORY AUTHORITY. The amendment is adopted under Texas Education Code (TEC), §7.102(c)(4), which requires the State Board of Education (SBOE) to establish curriculum and graduation requirements; TEC, §28.002(a), which identifies the subjects of the required curriculum; and TEC, §28.002(c), which requires the SBOE to identify by rule the essential knowledge and skills of each subject in the required curriculum that all students should be able to demonstrate and that will be used in evaluating instructional materials and addressed on the state assessment instruments.

CROSS REFERENCE TO STATUTE. The amendment implements Texas Education Code, §7.102(c)(4) and §28.002(a) and (c).

<rule>

§112.26. Science, Grade 6, Adopted 2021.

(a) Introduction.

(1) In Grades 6 through 8 Science, content is organized into recurring strands. The concepts within each grade level build on prior knowledge, prepare students for the next grade level, and establish a foundation for high school courses. In Grade 6, the following concepts will be addressed in each strand.

(A) Scientific and engineering practices. Scientific inquiry is the planned and deliberate investigation of the natural world using scientific and engineering practices. Scientific methods of investigation are descriptive, correlative, comparative, or experimental. The method chosen should be appropriate to the grade level and question being asked. Student learning for different types of investigations includes descriptive investigations, which have no hypothesis that tentatively answers the research question and involve collecting data and recording observations without making comparisons; correlative and comparative investigations, which have a hypothesis that predicts a relationship and involve collecting data, measuring variables relevant to the hypothesis that are manipulated, and comparing results; and experimental investigations, which involve processes similar to comparative investigations but in which a hypothesis can be tested by comparing a treatment with a control.

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

(ii) Engineering practices. Students identify problems and design solutions using appropriate tools and models.

(B) Matter and energy. Students build upon their knowledge of properties of solids, liquids, and gases and further explore their molecular energies. In Grade 6, students learn how elements are classified as metals, nonmetals, or metalloids based on their properties on the Periodic Table. Students have previous experience with mixtures in Grade 5. Grade 6 furthers their understanding by investigating the different types of mixtures. Subsequent grades will learn about compounds. In Grade 6, students compare the density of substances relative to fluids and identify evidence of chemical changes.

(C) Force, motion, and energy. Students investigate the relationship between force and motion using a variety of means, including calculations and measurements through the study of Newton's Third Law of Motion. Subsequent grades will study force and motion

through Newton's First and Second Laws of Motion. Energy occurs as either potential or kinetic energy. Potential energy can take several forms, including gravitational, elastic, and chemical energy. Energy is conserved throughout systems by changing from one form to another and transfers through waves.

(D) Earth and space. Cycles within Sun, Earth, and Moon systems are studied as students learn about seasons and tides. Students identify that the Earth is divided into spheres and examine the processes within and organization of the geosphere. Researching the advantages and disadvantages of short- and long-term uses of resources enables informed decision making about resource management.

(E) Organisms and environments. All living organisms are made up of smaller units called cells. Ecosystems are organized into communities, populations, and organisms. Students compare and contrast variations within organisms and how they impact survival. Students examine relationships and interactions between organisms, biotic factors, and abiotic factors in an ecosystem.

(2) Nature of science. Science, as defined by the National Academy of Sciences, is the "use of evidence to construct testable explanations and predictions of natural phenomena, as well as the knowledge generated through this process." This vast body of changing and increasing knowledge is described by physical, mathematical, and conceptual models. Students should know that some questions are outside the realm of science because they deal with phenomena that are not currently scientifically testable.

(3) Scientific observations, inferences, hypotheses, and theories. Students are expected to know that:

(A) observations are active acquisition of either qualitative or quantitative information from a primary source through the senses;

(B) inferences are conclusions reached on the basis of observations or reasoning supported by relevant evidence;

(C) hypotheses are tentative and testable statements that must be capable of being supported or not supported by observational evidence. Hypotheses of durable explanatory power that have been tested over a wide variety of conditions are incorporated into theories; and

(D) scientific theories are based on natural and physical phenomena and are capable of being tested by multiple independent researchers. Unlike hypotheses, scientific theories are well established and highly reliable explanations, but they may be subject to change as new areas of science and new technologies are developed.

(4) 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 distinguish between scientific decision-making practices and ethical and social decisions that involve science.

(5) Recurring themes and concepts. Science consists of recurring themes and making connections between overarching concepts. Recurring themes include structure and function, 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. Models have limitations but provide a tool for understanding the ideas presented. Students analyze a system in terms of its components and how these components relate to each other, to the whole, and to the external environment.

(6) 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.

(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 answer questions, 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 text, phenomena, models, or investigations;

(B) use scientific practices to plan and conduct descriptive, comparative, and experimental investigations and use engineering practices to design solutions to problems;

(C) use appropriate safety equipment and practices during laboratory, classroom, and field investigations as outlined in Texas Education Agency-approved safety standards;

(D) use appropriate tools such as graduated cylinders, metric rulers, periodic tables, balances, scales, thermometers, temperature probes, laboratory ware, timing devices, pH indicators, hot plates, models, microscopes, slides, life science models, petri dishes, dissecting kits, magnets, spring scales or force sensors, tools that model wave behavior, satellite images, hand lenses, and lab notebooks or journals;

(E) collect quantitative data using the International System of Units (SI) and qualitative data as evidence;

(F) construct appropriate tables, graphs, maps, and charts using repeated trials and means to organize data;

(G) develop and use models to represent phenomena, systems, processes, or solutions to engineering problems; and

(H) distinguish between scientific hypotheses, theories, and laws.

(2) Scientific and engineering practices. The student analyzes and interprets data to derive meaning, identify features and patterns, and discover relationships or correlations to develop evidence-based arguments or evaluate designs. The student is expected to:

(A) identify advantages and limitations of models such as their size, scale, properties, and materials;

(B) analyze data by identifying any significant descriptive statistical features, patterns, sources of error, or limitations;

(C) use mathematical calculations to assess quantitative relationships in data; and

(D) evaluate experimental and engineering designs.

(3) Scientific and engineering practices. The student develops evidence-based explanations and communicates findings, conclusions, and proposed solutions. The student is expected to:

(A) develop explanations and propose solutions supported by data and models and consistent with scientific ideas, principles, and theories;

(B) communicate explanations and solutions individually and collaboratively in a variety of settings and formats; and

(C) engage respectfully in scientific argumentation using applied scientific explanations and empirical evidence.

(4) Scientific and engineering practices. The student knows the contributions of scientists and recognizes the importance of scientific research and innovation on society. The student is expected to:

(A) relate the impact of past and current research on scientific thought and society, including the process of science, cost-benefit analysis, and contributions of diverse scientists as related to the content;

(B) make informed decisions by evaluating evidence from multiple appropriate sources to assess the credibility, accuracy, cost-effectiveness, and methods used; and

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

(5) Recurring themes and concepts. The student understands that recurring themes and concepts provide a framework for making connections across disciplines. The student is expected to:

(A) identify and apply patterns to understand and connect scientific phenomena or to design solutions;

(B) identify and investigate cause-and-effect relationships to explain scientific phenomena or analyze problems;

(C) analyze how differences in scale, proportion, or quantity affect a system's structure or performance;

(D) examine and model the parts of a system and their interdependence in the function of the system;

(E) analyze and explain how energy flows and matter cycles through systems and how energy and matter are conserved through a variety of systems;

(F) analyze and explain the complementary relationship between the structure and function of objects, organisms, and systems; and

(G) analyze and explain how factors or conditions impact stability and change in objects, organisms, and systems.

(6) Matter and energy. The student knows that matter is made of atoms, can be classified according to its properties, and can undergo changes. The student is expected to:

(A) compare solids, liquids, and gases in terms of their structure, shape, volume, and kinetic energy of atoms and molecules;

(B) investigate the physical properties of matter to distinguish between pure substances, homogeneous mixtures (solutions), and heterogeneous mixtures;

(C) identify elements on the periodic table as metals, nonmetals, metalloids, and rare Earth elements based on their physical properties and importance to modern life;

(D) compare the density of substances relative to various fluids; and

(E) identify the formation of a new substance by using the evidence of a possible chemical change, including production of a gas, change in thermal energy, production of a precipitate, and color change.

(7) Force, motion, and energy. The student knows the nature of forces and their role in systems that experience stability or change. The student is expected to:

(A) identify and explain how forces act on objects, including gravity, friction, magnetism, applied forces, and normal forces, using real-world applications;

(B) calculate the net force on an object in a horizontal or vertical direction using diagrams and determine if the forces are balanced or unbalanced; and

(C) identify simultaneous force pairs that are equal in magnitude and opposite in direction that result from the interactions between objects using Newton's Third Law of Motion.

(8) Force, motion, and energy. The student knows that the total energy in systems is conserved through energy transfers and transformations. The student is expected to:

(A) compare and contrast gravitational, elastic, and chemical potential energies with kinetic energy;

(B) describe how energy is conserved through transfers and transformations in systems such as electrical circuits, food webs, amusement park rides, or photosynthesis; and

(C) explain how energy is transferred through transverse and longitudinal waves.

(9) Earth and space. The student models the cyclical movements of the Sun, Earth, and Moon and describes their effects. The student is expected to:

(A) model and illustrate how the tilted Earth revolves around the Sun, causing changes in seasons; and

(B) describe and predict how the positions of the Earth, Sun, and Moon cause daily, spring, and neap cycles of ocean tides due to gravitational forces.

(10) Earth and space. The student understands the rock cycle and the structure of Earth. The student is expected to:

(A) differentiate between the biosphere, hydrosphere, atmosphere, and geosphere and identify components of each system;

(B) model and describe the layers of Earth, including the inner core, outer core, mantle, and crust; and

(C) describe how metamorphic, igneous, and sedimentary rocks form and change through geologic processes in the rock cycle.

(11) Earth and space. The student understands how resources are managed. The student is expected to:

(A) research and describe why resource management is important in reducing global energy poverty, malnutrition, and air and water pollution; and

(B) explain how conservation, increased efficiency, and technology can help manage air, water, soil, and energy resources.

(12) Organisms and environments. The student knows that interdependence occurs between living systems and the environment. The student is expected to:

(A) investigate how organisms and populations in an ecosystem depend on and may compete for biotic factors such as food and abiotic factors such as availability of light and water, range of temperatures, or soil composition;

(B) describe and give examples of predatory, competitive, and symbiotic relationships between organisms, including mutualism, parasitism, and commensalism; and

(C) describe the hierarchical organization of organism, population, and community within an ecosystem.

(13) Organisms and environments. The student knows that organisms have an organizational structure and variations can influence survival of populations. The student is expected to:

(A) describe the historical development of cell theory and explain how organisms are composed of one or more cells, which come from pre-existing cells and are the basic unit of structure and function;

(B) identify and compare the basic characteristics of organisms, including prokaryotic and eukaryotic, unicellular and multicellular, and autotrophic and heterotrophic; and

(C) describe how variations within a population can be an advantage or disadvantage to the survival of a population as environments change.