

Guidelines for Content Advisor Feedback on the Science Texas Essential Knowledge and Skills

Submitted by Gloria Chatelain

GUIDING QUESTIONS

1. Is the current structure or framework of the kindergarten–grade 12 science TEKS appropriate? If not, what recommendations do you have for organizing or structuring the TEKS?
 - *The “basic” K-12 FRAMEWORK is excellent; however, an update to modernize it with current STEM practices/College and Career Readiness would benefit all. Recommended considerations:*
 - *Refine the “INTRODUCTION” TEKS (#1-4) to include a “grade level boundary” and a “clarification statement” of what IS tested and NOT tested (similar to NGSS framework), to increase clarification and specificity. And include, in secondary, how to recognize reliable research sources*
 - *Delete and streamline some standards to reduce redundancy and save teach time*
 - *Interchange a few grade level TEKS to improve vertical alignment, especially in Grades 6-8*
 - *Incorporate Engineering and Design Practices where appropriate*
 - *Address Math concerns (Grades 6-8), whereby students are lacking the necessary algebraic skills to solve calculations (some math TEKS have not yet been introduced)*

2. Does each grade level and/or course follow a complete and logical development of science concepts presented within the grade level/course? If not, what improvements are needed?
 1. K-5 is very good, but requiring a few changes, please see chart below.
 2. Gr. 6-7-8 seem to require the most attention, regarding vertical alignment.
 3. 7th Grade is mostly life science, and requires alignment to retain the matter-energy connections found within other grades. *7th Grade has more TEKS than any other grade level.*
 4. A content gap occurs between 8th grade and 9th grade Biology. Students are not prepared for some Biology concepts, ex. polar vs. nonpolar, pH, etc.

See recommendations below:

| Action | Rationale |
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| <p>SE 2.5A – Add “gas” phase ...not just solid, liquid to 2nd grade (A) classify matter by physical properties, including relative temperature, texture, flexibility, and whether material is a solid or liquid; (See Pg.8)</p> | <ul style="list-style-type: none"> • Should not just be solid and liquid, please add “gas.” These kids understand what a gas is...even kinder can do it. |
| <p>SE 2.5C - Add freezing right after melting (B) compare changes in materials caused by heating and cooling; (C) demonstrate that things can be done to materials such as cutting, folding, sanding, and melting to change their physical properties; and (See Pg.8)</p> | <ul style="list-style-type: none"> • After reading 2.5B, “freezing” should be added to 2.5C |

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| <p>SE 2.6A - Change wording at end, to include freezing (A) investigate the effects on objects by increasing or decreasing amounts of light, heat, and sound energy such as how the color of an object appears different in dimmer light or how heat melts butter; (See Pg.8)</p> | <ul style="list-style-type: none"> • The TEKS reads, increasing or decreasing...it should not be just “melting”...please include how ice is formed. |
| <p>SE 3.5A - Add volume, right behind mass (A) measure, test, and record physical properties of matter, including temperature, mass, magnetism, and the ability to sink or float; (See Pg.10)</p> | <ul style="list-style-type: none"> • Add “volume” as a physical property, mass is there, but no volume. Yet in the tools, graduated cylinders are listed. Kids need practice reading volumetric measurements and understanding this property. |
| <p>SE 4.5A – Insert the word “density” for sink or float (A) measure, compare, and contrast physical properties of matter, including mass, volume, states (solid, liquid, gas), temperature, magnetism, and the ability to sink or float; and (See Pg.13)</p> | <ul style="list-style-type: none"> • Change “the ability to sink or float” to density |
| <p>SE 4.9A – Insert glucose (A) investigate that most producers need sunlight, water, and carbon dioxide to make their own food, while consumers are dependent on other organisms for food; and (See Pg.14)</p> | <ul style="list-style-type: none"> • Recommend glucose to be inserted into this SE, carbon dioxide is listed.... |
| <p>SE 6.6B - Limit math calculations, solve for D (B) calculate density to identify an unknown substance; and (See Pg.4)</p> | <ul style="list-style-type: none"> • ONLY calculate D...density values, omit using algebra to solve for M or V as variables, solve for D only • This Algebra TEKS has not yet been covered; however, solving for variables, M or V could be calculated in 7th grade |
| <p>6.6 Add an SE, “add a 6.6D” for solubility Matter and energy. The student knows matter has physical properties that can be used for classification. The student is expected to: (A) compare metals, nonmetals, and metalloids using physical properties such as luster, conductivity, or malleability; (B) calculate density to identify an unknown substance; and test the physical properties of minerals, including hardness, color, luster, and streak. (See Pg.4)</p> | <ul style="list-style-type: none"> • Solutions are not aligned in middle school. Dissolving is covered in elem, but no alignment after that, the 6th grade Intro TEKS focuses only on elements & compounds. Students never get solution basics, but they need it for Biology. There is a big gap. By adding a 6.6D - test the solubility of different substances in water, this is helpful, especially when discussing environmental disasters. |

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| <p>7.6 typo – insert an “(A)” in front of this SE distinguish between physical and chemical changes in matter. (See Pg.8)</p> | <p>Typo, there needs to be an “(A)” in front of this SE</p> |
| <p>7.10A Remove this SE (A) observe and describe how different environments, including microhabitats in schoolyards and biomes, support different varieties of organisms; (See Pg.9)</p> | <ul style="list-style-type: none"> • Covered in K-5, but insert vocabulary word.... “biome” into another TEKS |
| <p>7.10C – add “invasive” to describe weeds below (C) observe, record, and describe the role of ecological succession such as in a microhabitat of a garden with weeds. (See Pg. 9)</p> | <ul style="list-style-type: none"> • Students must understand repercussions of “invasive” species, and perhaps ADD additional examples, or delete garden with weeds |
| <p>7.13 Remove Whole Standard & SE’s (C) (13) Organisms and environments. The student knows that a living organism must be able to maintain balance in stable internal conditions in response to external and internal stimuli. The student is expected to:</p> | <ul style="list-style-type: none"> • To reduce content in 7th • It is covered in Biology 4B and 10A |
| <p>(A) investigate how organisms respond to external stimuli found in the environment such as phototropism and fight or flight; and (B) describe and relate responses in organisms that may result from internal stimuli such as wilting in plants and fever or vomiting in animals that allow them to maintain balance. (See Pg. 9)</p> | |
| <p>Insert SE 8.5 A,B,C into 7th Grade – Add to 7.6 and adjust wording in the K.S. statement to include periodic table content (A) describe the structure of atoms, including the masses, electrical charges, and locations, of protons and neutrons in the nucleus and electrons in the electron cloud; (B) identify that protons determine an element's identity and valence electrons determine its chemical properties, including reactivity; (C) interpret the arrangement of the Periodic Table, including groups and periods, to explain how properties are used to classify elements; (See Pg.12, 8)</p> | <ul style="list-style-type: none"> • Currently NO periodic table alignment in 7th grade. And 8th grade is too overloaded since it is a tested grade level. Reduces 8th grade content. • So 7.6 would consist of 7.6A,B,C,D |
| <p>SE 8.11B – Provide examples of short & long term changes (B) explore how short- and long-term environmental changes affect organisms and traits in subsequent populations; and (See Pg.13)</p> | <ul style="list-style-type: none"> • Elaborate short and long term changes, what kinds, more specificity |
| <p>SE Bio 10.C – Specify levels of organization (C) analyze the levels of organization in biological systems and relate the levels to each other and to the whole system. (See Pg.4)</p> | <ul style="list-style-type: none"> • Include Biome, Biosphere |

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| <p>SE Bio 6.D - Delete (D) recognize that gene expression is a regulated process</p> | <ul style="list-style-type: none"> • Delete this SE to save time, too complex to teach at this level |
| <p>SE Bio 7.F (F) analyze other evolutionary mechanisms, including genetic drift, gene flow, mutation, and recombination.</p> | <ul style="list-style-type: none"> • One of the professors recommended delete the word “mutation” |

- Are the core concepts specific to the disciplines of science (e.g., life science, physical science, and earth and space science) adequately addressed across the K–12 TEKS? If not, please identify the discipline and the concepts that are missing.
Yes; but 7th Grade needs addressing. Too much Life Science, not enough Physical Science. Please see chart in Question #2 for suggestions.
- Do the standards adequately address the broader concepts that cross various science disciplines (e.g., systems and system models, energy and matter, stability and change)?
Yes; but the “Intro TEKS” for each grade level are very lengthy, hence a lot for teachers to read. Recommend changes as stated in Question 1.
- Are there topics that should be eliminated because they no longer reflect current research or practices within the field? If so, please identify.
- Are the TEKS vertically aligned so that concepts are introduced, elaborated on, and refined across multiple grade levels and students will possess the necessary knowledge and skills to be successful in later grades? See Question 2 for itemized recommendations; but, probably the biggest gap occurs between 8th Grade & Biology. Students require a prerequisite of chemistry basics, such as solubility and the basic organic compounds (carbohydrates, lipids, proteins, nucleic acids). Ex. pH has NOT been covered, polar vs. nonpolar molecules is lacking, they do not know that organic compounds contain C, and they have never seen a chemical bond.
It is difficult for biology teachers to have to stop and implement basics.
- Do the high school courses sufficiently prepare students for postsecondary success? **Yes.**
- The current K–5 science TEKS encourage districts to devote the percentage of instructional time to classroom and outdoor investigations as follows: kindergarten and grade 1–80%, grades 2 & 3–60%, grades 4 & 5–50%. The secondary science TEKS require districts to devote at least 40% of instructional time to laboratory and field investigations.

Are these designations and percentages for instructional time appropriate? Do the current student expectations adequately support the instruction? **Yes; please keep current plan.**
- Are the student expectations clear and specific? If not, please give examples of how the language might be improved.
Specificity is still difficult for some TEKS. Example: 7.8C discusses effects of human activity ground water and surface water in a watershed; however, the “water table” is not mentioned in the intro TEKS or here, yet it can show up in diagrams on an 8th grade STAAR.
- Are there student expectations that are not essential or unnecessarily duplicative and can be eliminated? If so, please identify by grade level/course and student expectation number.
Yes: they are included in chart on Question 2.

11. What other suggestions do you have for ways in which the science TEKS can be improved?

1. Polish vocabulary in the IntroTEKS; needs to be more consistent, with more specificity. ex. 3rd grade discusses “Thrive & Perish”...and it is never, ever mentioned again. Most 5th grade teachers do not even know it, and it can be a tested TEKS.

2. Delete some of the Biology content. Teachers lose about a month of teach time prior to the test...a discussion is needed to assist in this endeavor. The genetics units could be abbreviated, eliminate “Gene Expression.”

3. What would be helpful to teachers, is to provide a mini TEKS prep-unit prior to entering grades 5, 8, and Bio. Or, compose a suggestion page to help teachers with prerequisite content.

Ex. After the 8th Grade STAAR test, teachers start preparing students with a BioPrep Unit (before they leave 8th grade), or provide a take-home packet.

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