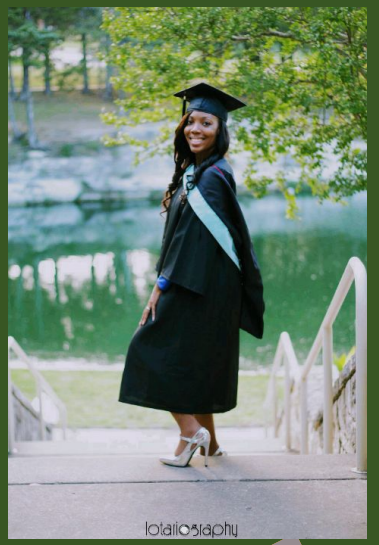
What's Coming to Science?

Mrs. Davenport

About Me!



I am a native of Dallas, Texas. She has served as a middle school science teacher, master teacher,curriculum leader, campus specialist and most currently a District Content Specialist. My educational background includes a Bachelor of Arts degree from The University of North Texas and a Masters Degree in Education from Walden University. My educational philosophy is that ALL students can learn regardless of background and socioeconomic status. I am excited about joining the LAN family as an academic content specialist and contributing my passion, knowledge and skills to enhance the LAN community.

I have been married to my husband, Brian since 2015.Outside of work I enjoy spending time with my family, friends and serving my church.

My favorite things!

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My family!

Introduce Yourself:

- Name
- How many years in education?
- Something that you want to accomplish this year.

Icebreaker

Take a skittle:
Based on the color of your skittle answer the following question

Purple: Favorite color
Red: Favorite food
Yellow: Dream vacation
Orange: Fun Fact
Green: What did you don this summer?

Learning Objective:

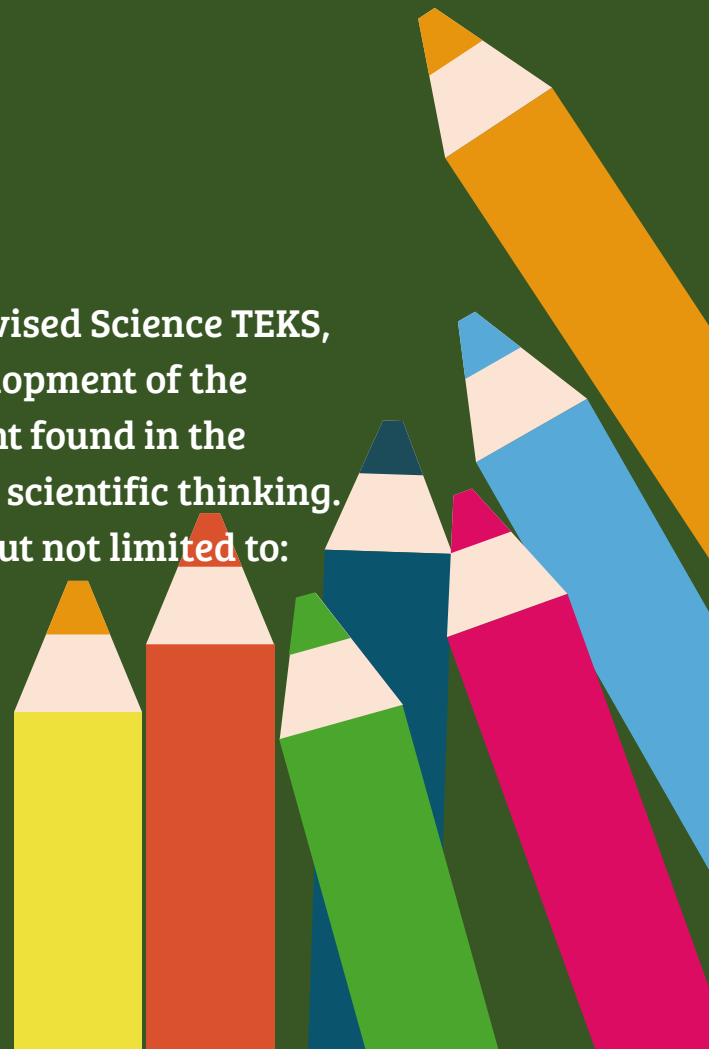
- Attendees will have a better and deeper understanding of the new science TEKS that will be implemented in the Fall of 2024.
- Attendees will be able to practice matching current science TEKS with the updated science TEKS.

The New TEKS:

The Revised Science TEKS have been formally adopted and will be implemented in Fall 2024

A Framework for K–12 Science Education was carefully considered during the adoption of the Revised Science TEKS, allowing for a three-dimensional approach to how we teach science in Texas. This led to the development of the recurring themes and concepts (RTCs), scientific and engineering practices (SEPs), and the content found in the updated TEKS. They were designed to maintain rigor and keep student expectations current with scientific thinking. The SBOE adopted new science standards for K-8 Science and the high school courses, including but not limited to:

- Biology
- Chemistry
- Integrated Physics and Chemistry
- Physics, Environmental Systems
- Anatomy and Physiology, and
- Forensic Science.



The Biggest Challenges

- Three Dimensional Curriculum
- Vertical Alignment

The Biggest Challenges

The biggest shift with the future science TEKS is from two dimensional (2D) to three dimensional (3D) curriculum. The current science TEKS function in a 2D sense through process skills and content TEKS .The process skills focused on scientific practice (the “how” of being a scientist), while the content TEKS focused on the content (the “what”). The future TEKS will replace the process skills with Science and Engineering Practices (SEPs) and Recurring Themes and Concepts (RTCs). The three dimensions of the future science TEKS include:

- Science and Engineering Practices (SEPs): These are the practices that scientists use to ask and answer questions, and the practices that engineers use to define problems and design solutions. Examples include communicating information and designing solutions. (The new teaching method is centered around a phenomenon and students have to investigate and ask questions centered around the phenomenon) Phenomenon:a fact or situation that is observed to exist or happen, especially one whose cause or explanation is in question.

- Recurring Themes and Concepts (RTCs): These are big-picture concepts that span the entire field of science, not just one grade level. They are evident across grades K-12 and are relevant to all students, not just students who will major in science in college. In general, if a student who comes through the K-12 school system is able to navigate these concepts, they can truly grasp the core of what science is and how we can use it to impact the world.

Vertical Alignment

- Vertical alignment was emphasized during the development process. In order to begin with the end in mind, the SBOE work group for high school developed their courses first in order to define what students ultimately need to take from the K-12 science curriculum. From there, the middle school and elementary courses were developed to build students up to that. Based on this format, you will find various spaces throughout K-12 where the content was either moved, added, or removed from the curriculum.

Scientific and Engineering Practices

- Practices that scientists use to ask and answer questions,

Scientific and Engineering Practices

	Grade 6	Grade 7	Grade 8	Biology
Planning Investigations	**6.1.A** Ask questions and define problems based on observations or information from text, phenomena, models, or investigations.	**7.1.A** Ask questions and define problems based on observations or information from text, phenomena, models, or investigations.	**8.1.A** Ask questions and define problems based on observations or information from text, phenomena, models, or investigations.	**B.1.A** Ask questions and define problems based on observations or information from text, phenomena, models, or investigations.
	6.1.B Use scientific practices to plan and conduct descriptive, comparative, and experimental investigations and use engineering practices to design solutions to problems.	**7.1.B** Use scientific practices to plan and conduct descriptive, comparative, and experimental investigations and use engineering practices to design solutions to problems.	**8.1.B** Use scientific practices to plan and conduct descriptive, comparative, and experimental investigations and use engineering practices to design solutions to problems.	**B.1.B** Apply scientific practices to plan and conduct descriptive, comparative, and experimental investigations and use engineering practices to design solutions to problems.
	6.1.C Use appropriate safety equipment and practices during laboratory, classroom, and field investigations as outlined in Texas Education Agency-approved safety standards.	**7.1.C** Use appropriate safety equipment and practices during laboratory, classroom, and field investigations as outlined in Texas Education Agency-approved safety standards.	**8.1.C** Use appropriate safety equipment and practices during laboratory, classroom, and field investigations as outlined in Texas Education Agency-approved safety standards.	**B.1.C** Use appropriate safety equipment and practices during laboratory, classroom, and field investigations as outlined in Texas Education Agency-approved safety standards.
Conducting Investigations	**6.1.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.	**7.1.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.	**8.1.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.	**B.1.D** Use appropriate tools such as microscopes, slides, Petri dishes, laboratory glassware, metric rulers, digital balances, pipets, filter paper, micropipettes, gel electrophoresis and polymerase chain reaction (PCR) apparatuses, microcentrifuges, water baths, incubators, thermometers, hot plates, data collection probes, test tube holders, lab notebooks or journals, hand lenses, and models, diagrams, or samples of biological specimens or structures.

Recurring Themes and Concepts

- <u>These are big-picture concepts that span the entire field of science, not just one grade level.</u>

	Grade 6	Grade 7	Grade 8	Biology
Resources	**6.4.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.	**7.4.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.	**8.4.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.	**B.4.C** Research and explore resources such as museums, libraries, professional organizations, private companies, online platforms, and mentors employed in STEM in order to investigate science, technology, engineering, and mathematics (STEM) careers.
Recurring Themes and Concepts	**6.5.A** Identify and apply patterns to understand and connect scientific phenomena or to design solutions.	**7.5.A** Identify and apply patterns to understand and connect scientific phenomena or to design solutions.	**8.5.A** Identify and apply patterns to understand and connect scientific phenomena or to design solutions.	
	6.5.B Identify and investigate cause-and-effect relationships to explain scientific phenomena or analyze problems.	**7.5.B** Identify and investigate cause-and-effect relationships to explain scientific phenomena or analyze problems.	**8.5.B** Identify and investigate cause-and-effect relationships to explain scientific phenomena or analyze problems.	
	6.5.C Analyze how differences in scale, proportion, or quantity affect a system's structure or performance.	**7.5.C** Analyze how differences in scale, proportion, or quantity affect a system's structure or performance.	**8.5.C** Analyze how differences in scale, proportion, or quantity affect a system's structure or performance.	
	6.5.D Examine and model the parts of a system and their interdependence in the function of the system.	**7.5.D** Examine and model the parts of a system and their interdependence in the function of the system.	**8.5.D** Examine and model the parts of a system and their interdependence in the function of the system.	
	6.5.E Analyze and explain how energy flows and matter cycles through systems and how energy and matter are conserved through a variety of systems.	**7.5.E** Analyze and explain how energy flows and matter cycles through systems and how energy and matter are conserved through a variety of systems.	**8.5.E** Analyze and explain how energy flows and matter cycles through systems and how energy and matter are conserved through a variety of systems.	
	6.5.F Analyze and explain the complementary relationship between the structure and function of objects, organisms, and systems.	**7.5.F** Analyze and explain the complementary relationship between the structure and function of objects, organisms, and systems.	**8.5.F** Analyze and explain the complementary relationship between the structure and function of objects, organisms, and systems.	
	6.5.G Analyze and explain how factors or conditions impact stability and change in objects, organisms, and systems.	**7.5.G** Analyze and explain how factors or conditions impact stability and change in objects, organisms, and systems.	**8.5.G** Analyze and explain how factors or conditions impact stability and change in objects, organisms, and systems.	

Combined K-12 Example

In Kindergarten, students learn to "identify, describe, and predict the **patterns** of day and night and their observable characteristics" (K.9.A) Their teacher regularly uses the words **pattern** and **changes** during students' investigations to help students internalize these big concepts. In 1st Grade, students "describe and predict the **patterns** of seasons of the year such as order of occurrence and **changes** in nature" (1.9) and in 4th grade, students study "**patterns of change** in the observable appearance of the Moon from Earth" (4.9.B). This lays the foundation for scientific understanding all the way through high school. For example, in HS physics, students study the motion of various objects to look for **patterns** in graphs of position vs. time, velocity vs. time, and acceleration vs. time (Physics.5.A,C). They also look for **patterns** in the characteristics of waves, including velocity, frequency, amplitude, and wavelength (Physics.8.C) and how **changing** one characteristic alters the others. By using the Recurring Themes of **patterns** and **change** over multiple years and topics, students learn that these concepts can be used to understand and describe phenomena from a variety of scientific disciplines.

LET'S TAKE A LOOK.... Category 1

Current TEKS Matter and Energy

5A	Recognize that radiant energy from the Sun is transformed into chemical energy through the process of photosynthesis.
5B	Diagram the flow of energy through living systems, including food chains, food webs, and energy pyramids.
6	Distinguish between physical and chemical changes in matter.

Removed

Moved to 7.12A and 8.12A

2024 TEKS Matter and its Properties

6A	Compare and contrast elements and compounds in terms of atoms and molecules, chemical symbols, and chemical formulas.
6B	Use the periodic table to identify the atoms and number of each kind within a chemical formula.
6C	Distinguish between physical and chemical changes in matter.
6D	Describe aqueous solutions in terms of solute and solvent, concentration, and dilution.
6E	Investigate and model how temperature, surface area, and agitation affect the rate of dissolution of solid solutes in aqueous solutions.

Modified and moved from 6.5A

Modified and moved from 8.5B

New

New

(5)	*Matter and energy. The student knows that interactions occur between matter and energy. The student is expected to:*		
5A	Recognize that radiant energy from the Sun is transformed into chemical energy through the process of photosynthesis.		
5B	Diagram the flow of energy through living systems, including food chains, food webs, and energy pyramids.(Moved to 7.12A and 8.12A)		
(6)	*Matter and energy. The student knows that matter has physical and chemical properties and can undergo physical and chemical changes. The student is expected to*	*(6)*	*Matter and energy. The student distinguishes between elements and compounds, classifies changes in matter, and understands the properties of solutions. The student is expected to:*
		6A	Compare and contrast elements and compounds in terms of atoms and molecules, chemical symbols, and chemical formulas. (Modified and moved from 6.5A)
		6B	Use the periodic table to identify the atoms and number of each kind within a chemical formula. (Modified and moved from 8.5B)
6	Distinguish between physical and chemical changes in matter.	6C	Distinguish between physical and chemical changes in matter.
		6D	Describe aqueous solutions in terms of solute and solvent, concentration, and dilution. (NEW)
		6E	Investigate and model how temperature, surface area, and agitation affect the rate of dissolution of solid solutes in aqueous solutions. (NEW)

Practice

- The blue strip represents the current TEKS
- The green strip represents the 2024 TEKS

With a partner, try to match the current TEKS with the new 2024 TEKS.

BRAIN BREAK

Let's Dive Deeper.....Category 2

Current TEKS Force and Motion

7A	Illustrate the transformation of energy within an organism such as the transfer from chemical energy to thermal energy.
7B	Demonstrate and illustrate forces that affect motion in organisms such as emergence of seedlings, turgor pressure, geotropism, and circulation of blood.

Removed

2024 TEKS Force and Motion

7A	Calculate average speed using distance and time measurements from investigations.
7B	Distinguish between speed and velocity in linear motion in terms of distance, displacement, and direction.
7C	Measure, record, and interpret an object's motion using distance-time graphs.
7D	Analyze the effect of balanced and unbalanced forces on the state of motion of an object using Newton's First Law of Motion.
8A	Investigate methods of thermal energy transfer into and out of systems, including conduction, convection, and radiation.
8B	Investigate how thermal energy moves in a predictable pattern from warmer to cooler until all substances within the system reach thermal equilibrium.
8C	Explain the relationship between temperature and the kinetic energy of the particles within a substance.

Modified and moved from 6.8C

Modified and moved from 8.6B

Modified and moved from 6.8D

Greatly modified and moved from 6.8B

Modified and moved from 6.9A

Modified and moved from 6.9B

New

(7)	*Force, motion, and energy. The student knows that there is a relationship among force, motion, and energy. The student is expected to:*	*(7)*	*Force, motion, and energy. The student describes the cause-and-effect relationship between force and motion. The student is expected to*
7A	Illustrate the transformation of energy within an organism such as the transfer from chemical energy to thermal energy		
7B	Demonstrate and illustrate forces that affect motion in organisms such as emergence of seedlings, turgor pressure, geotropism, and circulation of blood.		
		7A	Calculate average speed using distance and time measurements from investigations (Modified and moved from 6.8C)
		7B	Distinguish between speed and velocity in linear motion in terms of distance, displacement, and direction. (Modified and moved from 8.6B)
		7C	Measure, record, and interpret an object's motion using distance-time graphs. (Modified and moved from 6.8D)
		7D	Analyze the effect of balanced and unbalanced forces on the state of motion of an object using Newton's First Law of Motion.(Greatly modified and moved from 6.8B)
		(8)	*Force, motion, and energy. The student understands the behavior of thermal energy as it flows into and out of systems. The student is expected to:*
		8A	Investigate methods of thermal energy transfer into and out of systems, including conduction, convection, and radiation. (Modified and moved from 6.9A)
		8B	Investigate how thermal energy moves in a predictable pattern from warmer to cooler until all substances within the system reach thermal equilibrium. (Modified and moved from 6.9B)
		8C	Explain the relationship between temperature and the kinetic energy of the particles within a substance. (NEW)

Keep Diving.....Category 3

Current TEKS Earth and Space

8A	Predict and describe how catastrophic events such as floods, hurricanes, or tornadoes impact ecosystems.
8B	Analyze the effects of weathering, erosion, and deposition on the environment in ecoregions of Texas.
8C	Model the effects of human activity on groundwater and surface water in a watershed.
9A	Analyze the characteristics of objects in our solar system that allow life to exist such as the proximity of the Sun, presence of water, and composition of the atmosphere
9B	Identify the accommodations, considering the characteristics of our solar system, that enabled manned space exploration.

Removed

Removed

8A	Predict and describe how catastrophic events such as floods, hurricanes, or tornadoes impact ecosystems		
8B	Analyze the effects of weathering, erosion, and deposition on the environment in ecoregions of Texas		
8C	Model the effects of human activity on groundwater and surface water in a watershed.	11A	Analyze the beneficial and harmful influences of human activity on groundwater and surface water in a watershed
		11B	Describe human dependence and influence on ocean systems and explain how human activities impact these systems. (Modified and moved from 8.11C)
(9)	*Earth and space. The student knows components of our solar system. The student is expected to:*	*(9)*	*Earth and space. The student understands the patterns of movement, organization, and characteristics of components of our solar system. The student is expected to:*
		9A	Describe the physical properties, locations, and movements of the Sun, planets, moons, meteors, asteroids, comets, Kuiper belt, and Oort cloud. (Modified and moved from 6.11A)
		9B	Describe how gravity governs motion within Earth's solar system; (Modified and moved from 6.11B)
9A	Analyze the characteristics of objects in our solar system that allow life to exist such as the proximity of the Sun, presence of water, and composition of the atmosphere	9C	Analyze the characteristics of Earth that allow life to exist such as the proximity of the Sun, presence of water, and composition of the atmosphere.
9B	Identify the accommodations, considering the characteristics of our solar system, that enabled manned space exploration.		
		(10)	*Earth and space. The student understands the causes and effects of plate tectonics. The student is expected to:*
		10A	Describe the evidence that supports that Earth has changed over time, including fossil evidence, plate tectonics, and superposition. (Modified and moved from 8.9A)
		10B	Describe how plate tectonics causes ocean basin formation, earthquakes, mountain building, and volcanic eruptions, including supervolcanoes and hot spots. (Modified and moved from 8.9B)

2024 TEKS Earth and Space

9A	Describe the physical properties, locations, and movements of the Sun, planets, moons, meteors, asteroids, comets, Kuiper belt, and Oort cloud.
9B	Describe how gravity governs motion within Earth's solar system.
9C	Analyze the characteristics of Earth that allow life to exist such as the proximity of the Sun, presence of water, and composition of the atmosphere.
10A	Describe the evidence that supports that Earth has changed over time, including fossil evidence, plate tectonics, and superposition. (Modified and moved from 8.9A)
10B	Describe how plate tectonics causes ocean basin formation, earthquakes, mountain building, and volcanic eruptions, including supervolcanoes and hot spots.
11A	Analyze the beneficial and harmful influences of human activity on groundwater and surface water in a watershed
11B	Describe human dependence and influence on ocean systems and explain how human activities impact these systems.

Modified and moved from 6.11A

Modified and moved from 6.11B

Modified and moved from 8.9A

Modified and moved from 8.9B

Modified and moved from 8.11C

Professional Divers.....Category 4

10A	Observe and describe how different environments, including microhabitats in schoolyards and biomes, support different varieties of organisms		
10B	Describe how biodiversity contributes to the sustainability of an ecosystem. (Modified and moved to 8.12C)		
10C	Observe, record, and describe the role of ecological succession such as in a microhabitat of a garden with weeds. (Modified and moved to 8.12B)		
		12A	Diagram the flow of energy within trophic levels and describe how the available energy decreases in successive trophic levels in energy pyramids. (Moved from 7.5A)
		12B	Describe how ecosystems are sustained by the continuous flow of energy and the recycling of matter and nutrients within the biosphere. (NEW)
(11)	*Organisms and environments. The student knows that populations and species demonstrate variation and inherit many of their unique traits through gradual processes over many generations. The student is expected to:*		

11A	Examine organisms or their structures such as insects or leaves and use dichotomous keys for identification;		
11B	Explain variation within a population or species by comparing external features, behaviors, or physiology of organisms that enhance their survival such as migration, hibernation, or storage of food in a bulb. (Modified and moved to 6.13C)		
11C	Identify some changes in genetic traits that have occurred over several generations through natural selection and selective breeding such as the Galapagos Medium Ground Finch (Geospiza fortis) or domestic animals and hybrid plants. (Most content moved to 8.13C)	**13D**	Describe and give examples of how natural and artificial selection change the occurrence of traits in a population over generations.
(12)	*Organisms and environments. The student knows that living systems at all levels of organization demonstrate the complementary nature of structure and function. The student is expected to:*	*(13)*	*Organisms and environments. The student knows how systems are organized and function to support the health of an organism and how traits are inherited. The student is expected to:*
12A	Investigate and explain how internal structures of organisms have adaptations that allow specific functions such as gills in fish, hollow bones in birds, or xylem in plants		
12B	Identify the main functions of the systems of the human organism, including the circulatory, respiratory, skeletal, muscular, digestive, excretory, reproductive, integumentary, nervous, and endocrine systems;	**13A**	Identify and model the main functions of the systems of the human organism, including the circulatory, respiratory, skeletal, muscular, digestive, urinary, reproductive, integumentary, nervous, immune, and endocrine systems.
12C	Recognize levels of organization in plants and animals, including cells, tissues, organs, organ systems, and organisms;	**13B**	Describe the hierarchical organization of cells, tissues, organs, and organ systems within plants and animals.
12D	Differentiate between structure and function in plant and animal cell organelles, including cell membrane, cell wall, nucleus, cytoplasm, mitochondrion, chloroplast, and vacuole; (Modified and moved to 8.13A)		
12E	Compare the functions of cell organelles to the functions of an organ system.		
12F	Recognize the components of cell theory. (Modified and moved to 6.13A)		
(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:*		
13A	Investigate how organisms respond to external stimuli found in the environment such as phototropism and fight or flight		
13B	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.		
(14)	*Organisms and environments. The student knows that reproduction is a characteristic of living organisms and that the instructions for traits are governed in the genetic material. The student is expected to:*		

14A	Define heredity as the passage of genetic instructions from one generation to the next generation.		
14B	Compare the results of uniform or diverse offspring from asexual or sexual reproduction	**13C**	Compare the results of asexual and sexual reproduction of plants and animals in relation to the diversity of offspring and the changes in the population over time.
14C	Recognize that inherited traits of individuals are governed in the genetic material found in the genes within chromosomes in the nucleus. (Modified and moved to 8.13B)		
		(14)	*Organisms and environments. The student knows how the taxonomic system is used to describe relationships between organisms. The student is expected to:*
		14A	Describe the taxonomic system that categorizes organisms based on similarities and differences shared among groups. (Modified and moved from 6.12C)
		14B	Describe the characteristics of the recognized kingdoms and their importance in ecosystems such as bacteria aiding digestion or fungi decomposing organic matter. (Greatly modified and moved from 6.12D)

The Future.....

Don't let the future TEKS catch you by surprise!!

THANK

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