

4th Grade Science

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Elementary Science Curriculum Guide for 4th Grade

The state of Texas has identified science as a core subject area to be taught at each grade level. Students are to become proficient in the Texas standards known as the Texas Essential Knowledge and Skills (TEKS). The Brownsville Independent School District’s Elementary Science Scope and Sequence Chart is based on the TEKS. Each grade level timeline includes the introduction for the TEKS from the Texas Education Agency.

The Brownsville Independent School District has adopted the Full Option Science System (FOSS) program as the primary instructional resource to deliver science instruction in grades kindergarten through fifth grade. The FOSS program is a hands-on, inquiry-based science kit program developed by the Lawrence Hall of Science. The program is designed to deliver a high level of content and science skill to elementary children. In the chart that follows the introduction, the sequence for the FOSS program kits is listed across the top and the TEKS are listed along the left-hand side. In the columns to the left of each TEK the activity and investigation are listed. When using the FOSS program, teachers should refer to the chart to make sure that the appropriate TEK is reinforced in each investigation and activity.

Example

(Taken from Brownsville ISD “Timeline for 4th Grade”)

Introduction is from the Texas Essential Knowledge and Skills published by the Texas Education Agency.

Introduction (From the Texas Essential Knowledge and Skills)

- (1) In Grade 4, the study of science includes planning and implementing field and laboratory investigations using scientific methods, analyzing information, making informed decisions, and using tools such as compasses to collect information. Students also use computers and information technology tools to support scientific investigations.

	Objectives (TEKS)	Kit Scope and Sequence			
		Ideas and Inventions 1 st Six Weeks	Human Body 2 nd and 3 rd Six Weeks	Physics of Sound 4 th Six Weeks	Water 5 th & 6 th Six Weeks
	Scientific processes. The student conducts classroom and field investigations following home and school safety procedures and environmentally appropriate and ethical practices.				
4.1	(A) demonstrate safe practices during classroom and field investigations; and	Inv. 1 - 4	Inv. 1 - 4	Inv. 1 - 4	Inv. 1 - 4

Texas Essential Knowledge and Skill (TEK)

Number of TEK as per TEA

FOSS program kit title

Six Weeks that the kit will be taught

Investigation and Part of FOSS program that teaches a TEK
(Note that in grades K-2 the Investigations are called Activities)
In this example, it is Investigations 1 – 4 that teach TEK 4.1

Science Scope and Sequence Chart

Timeline for 4th Grade

Introduction (From the Texas Essential Knowledge and Skills)

- (1) In Grade 4, the study of science includes planning and implementing field and laboratory investigations using scientific methods, analyzing information, making informed decisions, and using tools such as compasses to collect information. Students also use computers and information technology tools to support scientific investigations.
- (2) As students learn science skills, they identify components and processes of the natural world including properties of soil, effects of the oceans on land, and the role of the Sun as our major source of energy. In addition, students identify the physical properties of matter and observe the addition or reduction of heat as an example of what can cause changes in states of matter.
- (3) Students learn the roles of living and nonliving components of simple systems and investigate differences between learned characteristics and inherited traits. They learn that adaptations of organisms that lived in the past may have increased some species' ability to survive.
- (4) Science is a way of learning about the natural world. Students should know how science has built a vast body of changing and increasing knowledge described by physical, mathematical, and conceptual models, and also should know that science may not answer all questions.
- (5) A system is a collection of cycles, structures, and processes that interact. Students should understand a whole in terms of its components and how these components relate to each other and to the whole. All systems have basic properties that can be described in terms of space, time, energy, and matter. Change and constancy occur in systems and can be observed and measured as patterns. These patterns help to predict what will happen next and can change over time.
- (6) Investigations are used to learn about the natural world. Students should understand that certain types of questions can be answered by investigations, and that methods, models, and conclusions built from these investigations change as new observations are made. Models of objects and events are tools for understanding the natural world and can show how systems work. They have limitations and based on new discoveries are constantly being modified to more closely reflect the natural world.

Objectives (TEKS)		Kit Scope and Sequence			
		Ideas and Inventions 1 st Six Weeks	Human Body 2 nd & 3 rd Six Weeks	Physics of Sound 4 th Six Weeks	Water 5 th & 6 th Six Weeks
	Scientific processes. The student conducts field and laboratory investigations following home and school safety procedures and environmentally appropriate and ethical practices.				
4.1	(A) demonstrate safe practices during field and laboratory investigations; and	Inv. 1 – 4	Inv. 1 – 4	Inv. 1 – 4	Inv. 1 – 4
4.1	(B) make wise choices in the use and conversation of resources and the disposal or recycling of				Inv. 1 – 4

	materials.				
	Scientific processes. The student uses scientific inquiry methods during field and laboratory investigations.				
4.2	(A) plan and important descriptive investigations including asking well-defend questions, formulating testable hypotheses, and selecting and using equipment and technology.	Inv. 4 Pt. 4	Inv. 1 – 4	Inv. 4 Pt. 1 & 2	Inv. 1 – 4
4.2	(B) collect information by observing and measuring.	Inv. 2 Pt. 1	Inv. 1 – 4	Inv. 2 Pt. 2	Inv. 1 – 4
4.2	(C) analyze and interpret information to construct reasonable explanations from direct and indirect evidence;	Inv. 1 – 4	Inv. 1 – 4	Inv. 1 – 4	Inv. 1 - 4
4.2	(D) communicate valid conclusions; and	Inv. 1 – 4	Inv. 1 – 4	Inv. 1 – 4	Inv. 1 – 4
4.2	(E) construct simple graphs, tables, maps and charts to organize, examine, and evaluate information.	Inv. 2 Pt. 1	Inv. 4 Pt. 1 – 4	Inv. 1 Pt. 1	Inv. 3 Pt. 2 Inv. 4 Pt. 3
	Scientific processes. The student uses critical thinking and scientific problem solving to make informed decisions.				
4.3	(A) analyze, review, and critique scientific explanations, including hypotheses and theories, as to their strengths and weaknesses using scientific evidence information.	Inv. 4 Pt. 2	Inv. 1 – 4	Inv. 1 Pt. 1 & 2	
4.3	(B) draw inferences based on information related to promotional materials for products and services;	Inv. 1 Pt. 1 – 3 Inv. 2 Pt. 1 – 3 Inv. 3 Pt. 1 - 3 Inv. 4 Pt. 1 – 3			
4.3	(C) represent the natural world using models and identify their limitations;		Inv. 1 – 4		
4.3	(D) evaluate the impact of research on scientific thought, society, and the environment; and	Inv. 1 Pt.1 – 3 Inv. 2 Pt. 1 – 3 Inv. 4 Pt. 1 – 3			

4.3	(E) connect Grade 4 science concepts with the history of science and contributions of scientists.	Inv. 1 – 4			Inv. 1 – 4
	Scientific processes. The student knows how to use a variety of tools and methods to conduct science inquiry.				
4.4	(A) collect and analyze information using tools including calculators, safety goggles, microscopes, cameras, sound recorders, computers, thermometers, hand lenses, meter sticks, rulers, balances, and compasses; and	Inv. 2 Pt. 1 Inv. 3 Pt. 3	Inv. 1 Pt. 3 Inv. 4 Pt. 2 & 3	Inv. 2 Pt. 1 – 3 Inv. 4 Pt. 2	Inv. 2 Pt. 2 Inv. 4 Pt. 3
4.4	(B) demonstrate that repeated investigations may increase the reliability of results.		Inv. 4 Pt 1 & 3		
	Science concepts. The student knows that complex systems may not work if some parts are removed.				
4.5	(A) identify and describe the roles of some organisms in living systems such as plants in a schoolyard, and parts in nonliving systems such as a light bulb in a circuit; and				Inv. 4 Pt. 2
4.5	(B) predict and draw conclusions about what happens when part of a system is removed.		Inv. 2 1 – 3 Inv. 3 1 – 3	Inv. 3 Pt. 2	
	Science concepts. The student knows that change can create recognizable patterns.				
4.6	(A) identify patterns of change such as in weather, metamorphosis, and objects in the sky.	Inv. 1 Pt 1 & 2		Inv. 3 Pt. 2	Inv. 1 – 4
4.6	(B) illustrate that certain characteristics of an object can remain constant even when the object is rotated like a spinning top, translated like a skater moving in a straight line, or reflected on a smooth surface; and	Inv. 4 Pt. 1 & 2			
	Science concepts. The student knows that matter has physical properties.				
4.7	(A) observe and record changes in the states of matter caused by the addition or reduction of heat; and				Inv. 2 Pt. 3 Inv. 3 Pt. 1 - 4

4.7	(B) conduct tests, compare data, and draw conclusions about physical properties of matter including about physical properties of matter including states of matter, conduction, density, and buoyancy.			Inv. 2 Pt. 1	Inv. 1 Pt. 1 – 3 Inv. 2 Pt. 1 - 3
	Science concepts. The student knows that adaptations may increase the survival of members of a species.				
4.8	(A) identify characteristics that allow members within a species to survive and reproduce;		Inv. 1 Pt. 2 & 3 Inv. 2 Pt. 1 – 4 Inv. 3 Pt. 1 – 4 Inv. 4 Pt. 2 & 3		
4.8	(B) compare adaptive characteristics of various species; and		Inv. 1 Pt. 3 Inv. 2 Pt. 4 Inv. 3 Pt. 2	Inv. 1 Pt. 3	
4.8	(C) identify the kinds of species that lived in the past and compare them to existing species.		Inv. 1 Pt. 2 & 3 Inv. 2 Pt. 1 – 4 Inv. 3 Pt. 3 Inv. 4 Pt 2 & 3		
	Science concepts. The student knows that many likenesses between offspring and parents are inherited or learned.				
4.9	(A) distinguish between inherited traits and learned characteristics; and		Inv. 4 Pt. 1		
4.9	(B) identify and provide examples of inherited traits and learned characteristics.		Inv. 4 Pt. 2		
	Science concepts. The student knows that certain past events affect present and future events.				
4.10	(A) identify and observe effects of events that require time for changes to be honorable including growth, erosion, dissolving, weathering, and flow; and				Inv. 1 – 4
4.10	(B) draw conclusions about “what happened before: using fossils or charts and tables.		Inv. 1 Pt. 1 & 3 Inv. 2 Pt. 1 – 3 Inv. 3 Pt. 1 & 2	Inv. 4 Pt. 2 & 3	

	Science concepts. The student knows that the natural world includes earth materials and objects in the sky. The student is expected to:				
4.11	(A) test properties of soils including texture, capacity to retain water, and ability to support life;				Inv. 4 Pt. 1 & 4
4.11	(B) summarize the effects of the oceans on land; and				Inv. 1 – 4
4.11	(C) identify the Sun as the major source of energy for the Earth and understand its role in the growth of plants, in the creation of winds, and in the water cycle.				Inv. 1 – 4

Appendices

ESL Learning Strategies for Science

Metacognitive Strategies:

Advance Organization

Students plan, monitor, and evaluate their learning of science concepts and skills.

What's my purpose for solving this problem or doing this experiment? What is the question? What will I use the information for?

Selective Attention

What is the most important information to pay attention to?

Organizational Planning

What are the steps of the scientific method I will need to follow?

Self-monitoring

Does the plan seem to be working? Am I getting the answer?

Self-assessment

Did I solve the problem/answer the question? How did I solve it? Is it a good solution? If not, what could I do differently?

Cognitive Strategies:

Elaborating Prior Knowledge

Students interact with the information to be learned, changing or organizing it either mentally or physically.

What do I already know about this topic or type of problem? What experiences have I had that are related to this? How does this information relate to other information?

Taking Notes

What's the best way to write down a plan to solve the problem? Table? Chart? List? Diagram?

Grouping

How can I classify this information? What is the same and what is different?

Making Inferences

Are there words I don't know that I must understand to solve the problem?

Using Images

What can I draw to help me understand and solve the problem? Can I make a mental picture or visualize this problem?

Social/Affective Strategies:

Students interact with others to assist learning, or use attitudes and feelings to help their learning.

Questioning for Clarification

What help do I need? Who can I ask? How should I ask?

Cooperating

How can I work with others to answer the question or solve the problem?

Safety Guidelines for the Brownsville Independent School District Elementary Science Program

4th Grade

- Always follow the safety procedures outlined by your teacher.
- Never put any materials in your mouth. Do not taste any chemicals unless your teacher specifically tells you to. Investigate with your other senses (touch, smell, sight, hearing).
- Do not smell any unknown material. If your teacher asks you to smell a material, wave a hand over the material to draw the scent toward your nose.
- Do not touch your face, mouth, ears, or eyes while working with chemicals, plants, or animals. There might be something on your hands that should not get in your eyes.
- Do not mix unknown chemicals just to see what might happen.
- Always wash your hands immediately after using chemicals.
- If something gets spilled or broken, tell your teacher. Do not clean up broken or spilled things unless your teacher tells you it is okay.
- Clean up your work space after each investigation.
- Be careful when using sharp or pointed tools. Always make sure that you protect your eyes and those of your neighbors.
- Report all accidents, even small ones, to your teacher.
- Follow directions and ask questions if you're unsure of what to do.
- Behave responsibly during science investigations.

Ideas & Inventions

- Some plants can cause allergies, be careful when picking leaves.
- Do not point the mirror straight at the sun. It can permanently damage your eyes.

Human Body

- Some people may have allergies to owl pellets. Let the teacher know if you don't feel well.
- Wash hands after working with owl pellets.
- Clean up your work space after each investigation.

Physics of Sound

- Do not put any objects in your ears.
- Be careful when working with sharp objects. Do not point sharp objects at others.

Water

- Rinse your hands with fresh water after working with the salt water.
- A lot of water is used in this unit. Take care to avoid spills or clean them up as soon as they occur, so that no one will slip and fall.

Safety rules adapted from
Full Option Science System
(FOSS) Modules