PhD SCIENCE® TEKS EDITION

Helping students develop an enduring understanding of science concepts

GREAT MINDS™

Great Minds® was founded on the belief that *every* child is capable of greatness.

To help them achieve it, children need access to high-quality, knowledge-building curricula. They need an approach to learning that takes them beyond the rote memorization that education publishers have relied on for years.

Answering the call for a new science curriculum to support the needed pedagogical changes, our teacher–writers and experts created *PhD Science® TEKS Edition*, a phenomenon-based program in which teachers facilitate the learning, but students own it. With *PhD Science TEKS Edition*, students rigorously engage in learning that coherently builds their understanding of science.

- **Knowledge Building:** Through hands-on investigations and evidence-based learning, students develop a deep, lasting understanding of science concepts that they can apply far beyond the anchor phenomenon of each module.
- **Coherent Storyline:** Each lesson builds on the lessons before it, so students develop their understanding of science concepts in the context of the anchor phenomenon.
- **Rigorous Engagement:** Students actively engage in a learning cycle of asking questions and sharing initial ideas about phenomena they study, investigating those questions, developing evidence-based explanations, and transferring their new knowledge to explain different phenomena. Supported by differentiation strategies the curriculum provides, all students engage with rigorous content through hands-on investigations, collaborative conversations, and analysis of authentic texts and media.

Activity Before Concept, Concept Before Terminology
Rather than simply memorizing definitions, *PhD Science TEKS Edition* students develop deep, lasting comprehension of scientific concepts through hands-on investigations and evidence-based learning about the phenomena they are exploring *before* they learn related terminology.

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The *PhD Science TEKS Edition* Approach to the Learning Cycle

Throughout each module, students engage in the learning cycle to make sense of and explain authentic phenomena.

They begin each module by generating questions and developing an initial explanation of the anchor phenomenon. Then students investigate various supporting phenomena to better understand the anchor phenomenon. Students periodically return to the anchor phenomenon to revise their explanation by applying evidence gathered through their investigations and data analysis.

At the end of the module, students participate in a Socratic Seminar to reflect on the conceptual understanding they have developed and used to explain multiple phenomena. Students transfer that knowledge to explain a new phenomenon in the End-of-Module Assessment.

The table on the right shows how particular student actions and the 7E phases relate to each stage of the *PhD Science TEKS Edition* learning cycle.

CONTENT STAGES	STUDENT ACTIONS THAT SUPPORT TEKS SCIENTIFIC INVESTIGATION AND REASONING	Strongly Related 7E Phases*
WONDER	• Observe a rich phenomenon and generate questions. • Connect prior understanding to the phenomenon.	Elicit Engage
ORGANIZE	• Develop an initial explanation of the phenomenon. • Focus on a question to investigate.	Explore
REVEAL	• Explore the question through investigation. • Analyze data to gather evidence relevant to the question.	Explore
DISTILL	• Apply evidence and reasoning to revise the explanation of the phenomenon. • Communicate new knowledge. Compare and synthesize with prior understanding and other information.	Explain
KNOW	• Generate new questions. • Apply knowledge to a different phenomena in a new context. • Connect knowledge across contexts to develop fundamental science conceptual understanding.	Elaborate Extend
ALL		Evaluate

*Although the Elicit and Engage phases both relate to the Wonder stage and the Elaborate and Extend phases both relate to the Know stage, each 7E phase includes unique elements that should not be conflated in instruction.

Scientific Investigation and Reasoning

With *PhD Science TEKS Edition*, students build their understanding of science concepts by engaging in the TEKS Scientific Investigation and Reasoning standards as they explore authentic phenomena. Students move from just reading about science to *doing* science.

For example, in Level 1 Module 2, students learn about light by studying wayang shadow puppetry and answering the Essential Question: How do puppeteers use light to tell stories during wayang shows?

When students participate in a hands-on investigation comparing different shadows with an object, surface, and light source, they determine that shadows form when objects block light from reaching surfaces. Their exploration of authentic, knowledge-rich phenomena helps them build an enduring understanding of science concepts.

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Inspiring students to wonder about the world and *empowering* them to makes sense of it.

LEVEL		MODULE 1	MODULE 2	MODULE 3
K	Module Topic	Weather	Life	Environments
	Anchor Phenomenon	Cliff Dwellings at Mesa Verde	Life in the Mojave Desert	Life in a Longleaf Pine Forest
	Essential Question	How did the cliff dwellings at Mesa Verde protect people from the weather?	How is Mara different from the Wonderland of Rocks?	Why are gopher tortoises disappearing?
	Instructional Text(s)	*Snow Day!*	*A Day and Night in the Desert*	*At Home with the Gopher Tortoise: The Story of a Keystone Species*
	Module Content Standards	K.5A, K.5B, K.6A, K.7C, K.8A, K.8B, K.8C	K.7A, K.7B, K.7C, K.9A, K.9B, K.10B, K.10C, K.10D	K.5A, K.7C, K.8A, K.8B, K.10A
	Spotlight Lessons	Forces and Motion	N/A	N/A
	Spotlight Lessons Content Standards	K.6B, K.6C, K.6D	N/A	N/A
1	Module Topic	Survival	Light	Sound
	Anchor Phenomenon	Life at a Pond	Wayang Shadow Puppetry	The Recycled Orchestra of Cateura
	Essential Question	How do pond plants and pond animals survive in their environment?	How do puppeteers use light to tell stories during wayang shows?	How does the Recycled Orchestra make music?
	Instructional Text(s)	*Over and Under the Pond*	*Blackout*	*Moses Goes to a Concert*
	Module Content Standards	1.9A, 1.9B, 1.9C, 1.10A, 1.10B, 1.10C, 1.10D	1.5A, 1.5C, 1.6A, 1.8B	1.5A, 1.6A, 1.6C
	Spotlight Lessons	Forces and Motion	Weather	Earth Materials
	Spotlight Lessons Content Standards	1.5A, 1.6B, 1.6C	1.5B, 1.6A, 1.8A, 1.8B, 1.8C, 1.8D	1.5A, 1.5C, 1.7A, 1.7B, 1.7C, 1.8D
2	Module Topic	Matter	Biomes	Sky
	Anchor Phenomenon	Birds Building Nests	Environments on and Below Mount Everest	Polynesian Navigation
	Essential Question	Why do different kinds of birds use certain materials to build their nests?	Why do so many kinds of plants and animals live below Mount Everest but so few live on it?	How did the Polynesians use observations of the Sun, stars, and the Moon to navigate from island to island?
	Instructional Text(s)	*A Nest Is Noisy* | *The Crayon Man: The True Story of the Invention of Crayola Crayons*	*Beastly Biomes* | *World of Wonder: Mountains*	*Island Below the Star: How the First People Came to Hawai'i*
	Module Content Standards	2.5A, 2.5B, 2.5C, 2.5D, 2.6A, 2.7C	2.7A, 2.7B, 2.9A, 2.9B, 2.9C, 2.10A, 2.10B, 2.10C	2.8C
	Spotlight Lessons	Forces and Motion	Weather	N/A
	Spotlight Lessons Content Standards	2.6B, 2.6C	2.8A, 2.8B	N/A

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LEVEL		MODULE 1	MODULE 2	MODULE 3
3	Module Topic	Earth Changes	Survival and Change	Forces and Motion
	Anchor Phenomenon	Transformation of Surtsey	Butterfly Survival	Motion in Space
	Essential Question	How can the island of Surtsey change shape over time?	How do butterflies survive over time in a changing environment?	Why do objects move differently in space than they do on Earth?
	Instructional Text(s)	*Life on Surtsey: Iceland's Upstart Island* | *World Traveler: The Sphinx* | *An Island Grows*	*A Butterfly is Patient* | *Amos & Boris*	*Moonshot: The Flight of Apollo 11*
	Module Content Standards	3.5A, 3.5C, 3.5D, 3.7A, 3.7B, 3.7C	3.5A, 3.5B, 3.5C, 3.5D	3.5A, 3.6A, 3.6B, 3.6C
	Spotlight Lessons	Matter	Weather	The Solar System
	Spotlight Lessons Content Standards	3.5A, 3.5B, 3.5C, 3.5D	3.8A	3.6A, 3.8B, 3.8C, 3.8D
4	Module Topic	Energy	Traits	Earth Systems
	Anchor Phenomenon	Windmills at Work	Individual Variation in Humpback Whales	Balinese Rice Farming
	Essential Question	How do windmills change wind to light?	What makes an individual humpback whale unique?	How has Balinese rice farming endured for 1,000 years?
	Instructional Text(s)	*The Boy Who Harnessed the Wind*	*Here Come the Humpbacks!*	*Cycle of Rice, Cycle of Life* | *The Buffalo Are Back*
	Module Content Standards	4.6A, 4.6B, 4.6C, 4.6D, 4.7C	4.10A, 4.10B, 4.10C	4.7A, 4.7B, 4.8B, 4.9A, 4.9B
	Spotlight Lessons	Matter	Weather and Sky	N/A
	Spotlight Lessons Content Standards	4.5A, 4.5B	4.5A, 4.8A, 4.8C	N/A
5	Module Topic	Earth Features	Ecosystems	Orbit and Rotation
	Anchor Phenomenon	Formation of the Grand Canyon's Features	Life Around a Mangrove Tree	Views from Earth and Space
	Essential Question	How did the Grand Canyon's features form?	How can trees support so much life?	How can we explain our observations of the Sun, the Moon, and stars from Earth?
	Instructional Text(s)	*Grand Canyon* | *Who Were the Wright Brothers?*	*The Mangrove Tree: Planting Trees to Feed Families* | *Living Sunlight*	*Look to the Stars* | *Look Up! Henrietta Leavitt, Pioneering Woman Astronomer*
	Module Content Standards	3.7B, 4.7C, 5.7A, 5.7B, 5.9D	3.9A, 3.10B, 4.7A, 5.9A, 5.9B, 5.9C, 5.10A, 5.10B	3.8D, 4.8C, 5.6C, 5.8C, 5.8D
	Spotlight Lessons	Matter	Weather and Climate	Capstone Project on Forces and Energy
	Spotlight Lessons Content Standards	5.5A, 5.5B, 5.5C	3.5C, 4.8A, 4.8B, 4.8C, 5.8A, 5.8B	3.6B, 5.5A, 5.6A, 5.6B, 5.6C, 5.6D

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