Vertical Alignment of Scientific and Engineering Practice: Developing and Using Models and Prototypes

TEKS in Focus highlights key concepts and student expectations to assist educators in implementing the Texas Essential Knowledge and Skills (TEKS) in science. The vertical progression of a concept within the science TEKS is presented, along with detailed explanations from the TEKS Guide. The scientific and engineering practices are the first strand of the science TEKS. To create a cohesive learning experience, educators should integrate scientific and engineering practices with content. Embedding these practices in the content provides students with the context to ask questions, develop models, and analyze data. This approach ensures that students develop critical thinking and problem-solving skills by applying scientific and engineering practices to real-world scenarios as they learn the content.

Detailed explanations are provided for the underlined terms and phrases in each student expectation. Detailed explanations call out a specific word or phrase in a student expectation to clarify what students should know and be able to do in reference to that word or phrase. Detailed explanations may include an instructional boundary that specifies Tier 1 (baseline) instructional expectations for all students.

Scientific and Engineering Practice 2C

Science TEKS	Term or Phrase	Detailed Explanations from TEKS Guide
K.2.C; 1.2.C; 2.2.C ***use mathematical concepts*** *to compare two objects with common attributes; and*	**use mathematical concepts**	In kindergarten and grade 1, students understand how to gather information using non-standard measurements. This includes selecting an appropriately sized everyday object to measure with, using the same object for consistent units, measuring without gaps, and starting and stopping at the correct places. Common non-standard units include paperclips and counting cubes, and students compare objects using attributes or characteristics such as size, shape, and quantity. In grade 2, students understand how to gather information using standard units of measurement, such as centimeters, and how to compare objects using attributes or characteristics such as size, shape, and quantity.
3.2.B; 4.2.B; 5.2.B ***use mathematical calculations*** *to compare patterns and relationships; and*	**use mathematical calculations**	Students in grades 3–5 apply mathematical calculations to compare quantities and metric measurements. In grade 3, students begin using perimeter and area calculations. In grade 5, students begin calculating volume in cubic units.

Science TEKS	Term or Phrase	Detailed Explanations from TEKS Guide
6.2.B; 7.2.B; 8.2.B ***use mathematical calculations*** *to assess quantitative relationships in data; and*	**use mathematical calculations**	In grades 6-8, students should analyze quantitative data mathematically. The specific equations and calculations students should master are provided within the detailed explanations for each relevant student expectation.

TEKS Guide Glossary Terms (found in one or more student expectations of this vertical alignment):
Glossary terms and definitions in the TEKS Guide are consistent from kindergarten through high school. The definitions provide educators with a common understanding of the terms, regardless of the grade level they teach. Glossary definitions are not intended for use with students.

attribute: a quality, property, or characteristic ascribed to someone or something

data: factual information (such as observations, measurements, or statistics) used as a basis for reasoning, discussion, or calculation; often includes both useful and irrelevant or redundant information and must be processed to be meaningful

patterns: regular sequences that can be found throughout nature