

# Extreme Deep: *Mission to the Abyss*

## TEKS Alignment

### CHAPTER 111: MATHEMATICS

#### ❖ Subchapter A: Elementary School

Broadly, *Extreme Deep: Mission to the Abyss* covers the following knowledge and skills of elementary mathematics:

- Number, operation, and quantitative reasoning
- Patterns, relationships, and algebraic thinking
- Underlying processes and mathematical tools
- Geometry and spatial reasoning
- Probability and statistics
- Measurement

Specifically, knowledge and skills covered by *Extreme Deep: Mission to the Abyss* are:

**Number, operation, and quantitative reasoning.** Students will describe order of events or objects. Students will use language such as before or after to describe relative position in a sequence of events or objects; and name the ordinal positions in a sequence such as first, second, third, etc.

**Patterns, relationships, and algebraic thinking.** Students will identify, extend, and create patterns of sounds, physical movement, and concrete objects. Students will use patterns to predict what comes next, including cause-and-effect relationships. Students will identify, describe, and extend concrete and pictorial patterns in order to make predictions and solve problems.

**Geometry and spatial reasoning.** Students will describe the relative positions of objects. Students will describe one object in relation to another using informal language such as over, under, above, and below; and place an object in a specified position. Students will recognize, describe, identify and compare attributes of two- and three-dimensional geometric figures.

**Measurement.** Students will use time to describe, compare, and order events and situations. Students will compare events according to duration, and sequence events. Students will directly compare the attributes of length, area, weight/mass, capacity, and temperature. Students will understand that time can be measured. Students will use time to describe and compare situations. Students will order three or more events according to duration; and read time to the hour and half-hour using analog and digital clocks. Students will use standard tools to estimate and measure both time and temperature.

**Probability and statistics.** Students will use graphs to answer questions. Students will use information from organized data. Students will draw conclusions and answer questions using information organized in real-object graphs, picture graphs, and bar-type graphs. Students will draw conclusions and answer questions based on picture graphs and bar-type graphs.

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**Underlying processes and mathematical tools.** Students apply Elementary mathematics to solve problems connected to activities outside of school. Students will solve problems with guidance that incorporates the processes of understanding the problem, and evaluating the solution for reasonableness; and use tools such as real objects, and technology to solve problems. Students will communicate mathematical ideas using objects, words, pictures, numbers, and technology; and relate everyday language to mathematical language and symbols. Students will use logical reasoning. Students will justify his or her thinking using objects, words, pictures, numbers, and technology.

### ❖ Subchapter B: Middle School

Broadly, *Extreme Deep: Mission to the Abyss* covers the following knowledge and skills of middle school mathematics:

- Patterns, relationships, and algebraic thinking
- Measurement
- Geometry and spatial reasoning
- Probability and statistics
- Underlying processes and mathematical tools

Specifically, knowledge and skills covered by *Extreme Deep: Mission to the Abyss* are:

**Patterns, relationships, and algebraic thinking.** Students will solve problems involving direct proportional relationships. Students will use ratios to describe proportional situations; and use ratios to make predictions in proportional situations. Students will represent a relationship in numerical, geometric, verbal, and symbolic form.

**Geometry and spatial reasoning.** Students will use coordinate geometry to identify location in two dimensions, and describe location on a plane. Students will locate and name points on a coordinate plane using ordered pairs of non-negative rational numbers. Students will compare and classify two- and three-dimensional figures using geometric vocabulary and properties. Students will use geometry to model and describe the physical world.

**Measurement.** Students will solve application problems involving estimation and measurement of length, area, time, temperature, volume, weight, and angles. Students will estimate measurements; select and use appropriate units, tools, or formulas to measure and to solve problems involving length, area, time, temperature, volume, and weight; and convert measures from customary to metric.

**Probability and statistics.** Students will use experimental and theoretical probability to make predictions. Students will find the probabilities of a simple event and its complement and describe the relationship between the two. Students will use statistical

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representations to analyze data. Students will solve problems by interpreting data. Students will recognize that a physical or mathematical model (including geometric) can be used to describe the experimental and theoretical probability of real-life events. Students will understand that the way a set of data is displayed influences its interpretation.

**Underlying processes and mathematical tools.** Student will apply Middle School mathematics to solve problems connected to investigations in other disciplines, and activities outside of school. Students will use a problem-solving model that incorporates understanding the problem, and evaluating the solution for reasonableness. Students will develop an appropriate problem-solving strategy from a variety of different types; and select tools such as manipulatives, and technology or techniques such as mental math or estimation to solve problems. Students will validate conclusions using mathematical properties and relationships.

### ❖ Subchapter C: High School

Broadly, *Extreme Deep: Mission to the Abyss* covers the following knowledge and skills of high school mathematics:

- Underlying processes and mathematical tools
- Geometric thinking and spatial reasoning
- The relationship between geometry, other mathematics, and other disciplines

Specifically, knowledge and skills covered by *Extreme Deep: Mission to the Abyss* are:

**Underlying mathematical processes.** Many processes underlie all content areas in mathematics. As they do mathematics, students continually use problem-solving, language and communication, and reasoning to make connections within and outside mathematics. Students will use multiple representations, technology, applications and modeling, and numerical fluency in problem-solving contexts.

**Geometric thinking and spatial reasoning.** Spatial reasoning plays a critical role in geometry; geometric figures provide powerful ways to represent mathematical situations and to express generalizations about space and spatial relationships. Students will use geometric thinking to understand mathematical concepts and the relationships among them.

**The relationship between geometry, other mathematics, and other disciplines.** Geometry can be used to model and represent many mathematical and real-world situations. Students will perceive the connection between geometry and the real and mathematical worlds and use geometric ideas, relationships, and properties to solve problems.

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### CHAPTER 112: SCIENCE

#### ❖ Subchapter A: Elementary School

Broadly, *Extreme Deep: Mission to the Abyss* covers the following knowledge and skills of elementary school science:

- Scientific processes
- Science concepts

Specifically, knowledge and skills covered by *Extreme Deep: Mission to the Abyss* are:

**Scientific processes.** Students will develop abilities necessary to do scientific inquiry in the field and the classroom. Students will ask questions about organisms, objects, and events; gather information using simple equipment and tools to extend the senses; communicate findings about simple investigations. Students will use age-appropriate tools and models to verify that organisms and objects and parts of organisms and objects can be observed, described, and measured. Students will identify and use senses as tools of observation. Students will explain a problem in his/her own words and identify a task and solution related to the problem. Students will compare results of investigations with what students and scientists know about the world. Students use critical thinking and scientific problem solving to make informed decisions. Students will evaluate the impact of research on scientific thought, society, and the environment; and will connect elementary school science concepts with the history of science and contributions of scientists.

**Science concepts.** Students know that organisms, objects, and events have properties and patterns. Students will describe properties of objects and characteristics of organisms; observe and identify patterns, and recognize and copy patterns seen in charts and graphs. Students know that many types of change occur. Students will observe changes in mass, position, temperature, sound, and movement; and will compare objects according to temperature. Students know that the natural world includes water. Students will identify and describe a variety of natural sources of water including streams, lakes, and oceans. Students know that forces cause change. Students will learn that the surface of the Earth can be changed by forces such as earthquakes and glaciers. Students know that species have different adaptations that help them survive and reproduce in their environment. Students will observe and identify characteristics among species that allow each to survive and reproduce; and learn how adaptive characteristics help individuals within a species to survive and reproduce. Students know that certain past events affect present and future events. Students will observe effects of events that require time for changes to be noticeable; and draw conclusions charts and tables.

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### ❖ Subchapter B: Middle School

Broadly, *Extreme Deep: Mission to the Abyss* covers the following knowledge and skills of middle school science:

- Scientific processes
- Science concepts

Specifically, knowledge and skills covered by *Extreme Deep: Mission to the Abyss* are:

**Scientific processes.** Students use scientific inquiry methods during field and laboratory investigations. Students will use investigative procedures including asking questions, formulating testable hypotheses, and selecting and using equipment and technology; collect data by observing and measuring; and, communicate valid conclusions. Students use critical thinking and scientific problem solving to make informed decisions. Students will evaluate the impact of research on scientific thought, society, and the environment; and connect Middle School science concepts with the history of science and contributions of scientists.

**Scientific concepts.** Students know that systems may combine with other systems to form a larger system. Students will identify and describe a system that results from the combination of two or more systems such as in the ocean. Students know that complex interactions occur between matter and energy. Students will understand energy flow in living systems including food chains and food webs. Students know that the responses of organisms are caused by internal or external stimuli. Students will identify responses in organisms to external stimuli such as the absence of heat and light; and identify components of an ecosystem to which organisms may respond. Students know that the equilibrium of a system may change. Students will describe how systems may reach equilibrium such as when a volcano erupts; and observe and describe the role of ecological succession in maintaining equilibrium in an ecosystem. Students know that complex interactions occur between matter and energy. Students will illustrate examples of potential and kinetic energy in the environment such as movement of geologic faults. Student knows that natural events and human activity can alter Earth systems. Students will make inferences and draw conclusions about effects of human activity on Earth's renewable, non-renewable, and inexhaustible resources.

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### ❖ Subchapter C: High School

Broadly, *Extreme Deep: Mission to the Abyss* covers the following knowledge and skills of high school science:

- Geology, Meteorology, and Oceanography
- Environmental Systems
- Physics
- Biology
- Aquatic Science

Specifically, knowledge and skills covered by *Extreme Deep: Mission to the Abyss* are:

**Geology, Meteorology, and Oceanography.** The student knows the Earth's unique characteristics and conditions. The student is expected to analyze conditions on Earth that enable organisms to survive. The student knows the processes of plate tectonics. The student is expected to learn about continental drift and sea-floor spreading; analyze the processes that power the movement of the Earth's continental and oceanic plates and identify the effects of this movement including faulting, folding, earthquakes, and volcanic activity. The student knows characteristics of oceans. The student is expected to identify physical characteristics of ocean water including salinity, solubility, heat capacity, and density; and, compare the topography of the ocean floor to the topography of the continents.

**Physics.** The student knows forces in nature. The student is expected to identify the influence of mass and distance on gravitational forces. The student knows the characteristics and behavior of waves. The student is expected to examine a variety of waves and wave characteristics in water such as velocity, frequency, amplitude, and behaviors such as reflection, refraction, and interference.

**Aquatic Science.** The student knows the components of aquatic ecosystems. The student is expected to differentiate among freshwater, brackish, and saltwater ecosystems. The student knows the relationships within and among the aquatic habitats and ecosystems in an aquatic environment. The student is expected to learn about an established aquatic habitat and the behavior of organisms; identify the interdependence of organisms in an aquatic environment. The student knows environmental adaptations of aquatic organisms. The student is expected to compare and describe how adaptations allow an organism to exist within an aquatic environment; predict adaptations of an organism prompted by environmental changes. The student knows that geological phenomena and fluid dynamics affect aquatic systems. The student is expected to demonstrate the principles of fluid dynamics including Archimedes' and Bernoulli's Principles and hydrostatic pressure; identify interrelationships of plate tectonics, ocean currents, climates, and biomes.

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**Environmental Systems.** The student knows the sources and flow of energy through a deep ocean environmental system. The student is expected to summarize forms and sources of energy; explain the flow of energy in a deep ocean ecosystem; investigate and explain the effects of energy transformations within that ecosystem; and investigate and identify energy interactions in a deep ocean ecosystem.

**Biology.** The student knows metabolic processes and energy transfers that occur in living organisms. The student is expected to compare the energy flow in a photosynthetic food chain to the energy flow in a vent sulfide energy food chain; and analyze the flow of matter and energy through different trophic levels and between organisms and the physical environment. The student knows that interdependence and interactions occur within an ecosystem. The student is expected to analyze the flow of energy; interpret interactions among deep ocean organisms exhibiting predation, parasitism, and mutualism; compare variations, tolerances, and adaptations of plants and animals in the deep ocean; identify and illustrate that long-term survival of species is dependent on a resource base that may be limited; and investigate and explain the interactions in a deep ocean ecosystem.