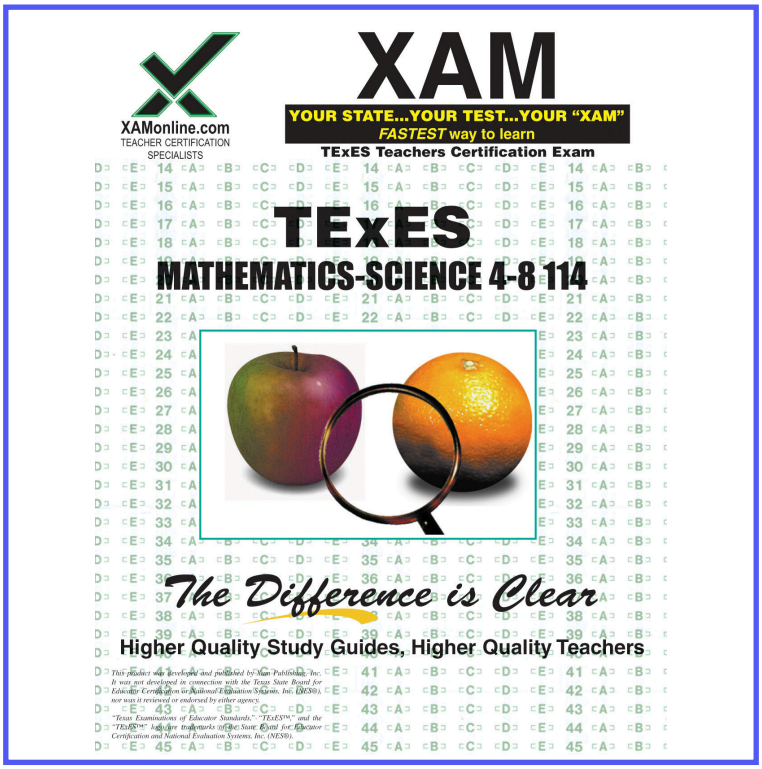

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DOMAIN VII. SCIENTIFIC INQUIRY AND PROCESS

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Skill 20.2 Knows procedures for and sources of information regarding the appropriate handling, use, disposal, care, and maintenance of chemicals, materials, specimens, and equipment 204

Skill 20.3 Knows procedures for the safe handling and ethical care and treatment of organisms and specimens 205

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Skill 21.2 Understands concepts of precision, accuracy, and error with regard to reading and recording numerical data from a scientific instrument 209

Skill 21.3 Understands how to gather, organize, display, and communicate data in a variety of ways 210

Skill 21.4 Understand the international system of measurement and performs unit conversions within measurement systems 211

COMPETENCY 022 UNDERSTANDING THE PROCESS OF SCIENTIFIC INQUIRY AND THE HISTORY AND NATURE OF SCIENCE 212

Skill 22.1 Understands the characteristics of various types of scientific investigations 212

Skill 22.2 Understands how to design, conduct, and communicate the results of a variety of scientific investigations 213

Skill 22.3 Understands the historical development of science and the contributions that diverse cultures and individuals of both genders have made to scientific knowledge 213

Skill 22.4 Understands the roles that logical reasoning, verifiable evidence, prediction, and peer review play in the process of generating and evaluating scientific knowledge 216

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Skill 22.6 Develops, analyzes, and evaluates different explanations for a given scientific result 217

Skill 22.7 Demonstrates an understanding of potential sources of error in inquiry based investigation 218

Skill 22.8 Demonstrates an understanding of how to communicate and defend the results of an inquiry-based investigation 218

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Skill 23.2 Applies scientific principles and the theory of probability to analyze the advantages of, disadvantages of, or alternatives to a give decision or course of action 220

Skill 23.3 Applies scientific principles and the processes to analyze factors that influence personal choices concerning fitness and health, including physiological and psychological effect and risks associated with the use of substances and substance abuse..... 220

Skill 23.4 Understand concepts, characteristics, and issues related to changes in populations and human population growth 221

Skill 23.5 Understand the types and uses of natural resources and the effects of human consumption of the renewal and depletion of resources 222

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COMPETENCY 024 UNDERSTANDING THE UNIFYING CONCEPTS AND PROCESSES THAT ARE COMMON TO ALL SCIENCES 225

Skill 24.1 Understands how the following concepts and processes provide and unifying explanatory framework across the science disciplines: systems, order, and organization; evidence, models, and explanation; change, constancy, and measurements; evolution and equilibrium; and form and function 225

Skill 24.2 Demonstrates an understanding of how patterns in observations and data can be used to make explanations and predictions 226

Skill 24.3 Analyzes interactions and interrelationships between systems and subsystems 227

Skill 24.4 Analyzes unifying concepts to explore similarities in a variety of natural phenomena 228

Skill 24.5 Understands how properties and patterns of systems can be described in terms of space, time, energy, and matter 229

Skill 24.6 Understands how change and constancy occur in systems 230

Skill 24.7 Understands the complementary nature of form and function in a given system 231

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Skill 25.4 Identifies the forces acting on an object and applies Newton's laws to describe the motion of an object.....235

Skill 25.5 Analyzes the relationship between force and motion in a variety of situations.....236

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Skill 26.2 Describes the physical properties and molecular structure of solids, liquids, and gases 240

Skill 26.3 Describes the relationship between the molecular structure of materials and their physical properties.....240

Skill 26.4 Relates the physical properties of an element to its placement in the periodic table 242

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Skill 27.3 Relates the chemical properties of an element to its placement in the periodic table 250

Skill 27.4 Describes chemical bonds and chemical formulas 251

Skill 27.5 Analyzes chemical reactions and their associated chemical equations 253

Skill 27.6 Explains the importance of a variety of chemical reactions that occur in daily life 254

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Skill 28.2 Understands the concept of heat energy and the difference between heat and temperature 261

Skill 28.3 Understands the principles of electricity and magnetism and their applications 263

Skill 28.4 Applies knowledge of properties of light to describe the function of optical systems and phenomena 267

Skill 28.5 Demonstrates an understanding of the properties, production, and transmission of sound 269

Skill 28.6 Applies knowledge of properties and characteristics of waves to describe a variety of waves 270

COMPETENCY 029 UNDERSTANDING ENERGY TRANSFORMATIONS AND THE CONSERVATION OF MATTER AND ENERGY 273

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Skill 29.2 Applies the law of conservation of matter to analyze a variety of situations 273

Skill 29.3 Describes sources of electrical energy and processes of energy transformation for human uses 274

Skill 29.4 Understands exothermic and endothermic chemical reactions and their applications 275

Skill 29.5 Applies knowledge of the transfer of energy in a variety of situations (e.g., the production of heat, light, sound, and magnetic effects by electrical energy; the process of photosynthesis; weather processes; food webs; food/energy pyramids) 275

Skill 29.6 Applies the law of conservation of energy to analyze a variety of physical phenomena 276

Skill 29.7 Understands applications of energy transformations and the conservation of matter and energy in life and earth/space science 277

DOMAIN IX. THE LIFE SCIENCES

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Skill 30.2 Analyzes how structure complements function in cells 280

Skill 30.3 Analyzes how structure complements function in tissues, organs, organ systems, and organisms 282

Skill 30.4 Identifies human body systems and describes their functions 283

Skill 30.5 Describes how organisms obtain and use energy and matter 291

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Skill 31.2 Understands the organization of heredity material 297

Skill 31.3 Describes how an inherited trait can be determined by one or many genes and how more than one trait can be influenced by a single gene 299

Skill 31.4 Distinguishes between dominant and recessive traits and predict the probable outcomes of genetic combinations 300

Skill 31.5 Evaluates the influence of environmental and genetic factors on the traits of an organism 301

Skill 31.6 Describes current applications of genetic research 302

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Skill 32.1 Describes similarities and differences among various types of organisms and methods of classifying organisms 303

Skill 32.2 Describes traits in a population of species that enhance its survival and reproductive success 305

Skill 32.3 Describes how populations and species change through time 306

Skill 32.4 Applies knowledge of the mechanisms and processes of biological evolution (e.g., variation, mutation, environmental factors, natural selection) 307

Skill 32.5 Describes evidence that supports the theory of evolution on life on Earth 308

COMPETENCY 033 UNDERSTANDING REGULATORY MECHANISMS AND BEHAVIOR 311

Skill 33.1 Describes how organisms respond to internal and external stimuli 311

Skill 33.2 Applies knowledge of structures and physiological processes that maintain stable internal conditions 312

Skill 33.3 Demonstrates an understanding of feedback mechanisms that allow organisms to maintain stable internal conditions 313

Skill 33.4 Understands how evolutionary history affects behavior 314

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Skill 34.2 Analyzes the interrelationships among producers, consumers, and decomposers in an ecosystem 315

Skill 34.3 Identifies factors that influence the size and growth of population in an ecosystem 316

Skill 34.4 Analyzes adaptive characteristics that result in a population's or species' unique niche in an ecosystem 317

Skill 34.5 Describes and analyzes energy flow through various types of ecosystems 318

Skill 34.6 Knows how populations and species modify and affect ecosystems 319

DOMAIN X. EARTH AND SPACE SCIENCE

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Skill 35.1 Understands the structure of Earth and analyzes constructive and destructive processes that produce geological change 321

Skill 35.2 Understands the form and function of surface and subsurface water 324

Skill 35.3 Applies knowledge of the composition and structure of the atmosphere and its properties 326

Skill 35.4 Demonstrates an understanding of the interactions that occur among the biosphere, geosphere, hydrosphere, and atmosphere 327

Skill 35.5 Applies knowledge of how human activity and natural processes, both gradual and catastrophic, can alter earth systems 328

Skill 35.6 Identifies the sources of energy in earth systems and describes mechanisms of energy transfer 329

COMPETENCY 036 UNDERSTANDING CYCLES IN THE EARTH'S SYSTEMS 330

Skill 36.1 Understands the rock cycle and how rocks, minerals, and soils are formed 330

Skill 36.2 Understands the water cycle and its relationship to earth systems 332

Skill 36.3 Understand the nutrient cycle and its relationship to earth systems 332

Skill 36.4 Applies knowledge of how human and natural processes affect earth systems 333

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Skill 37.2 Compares and contrasts weather and climate 334

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