TExES Science 4-8 (116) Exam

These slides overview information for each domain within the Science 4-8 (116) Exam. This test is designed to assess whether an examinee has the requisite knowledge and skills that an entry-level educator in this field in Texas public schools must possess.

TutoringEZ

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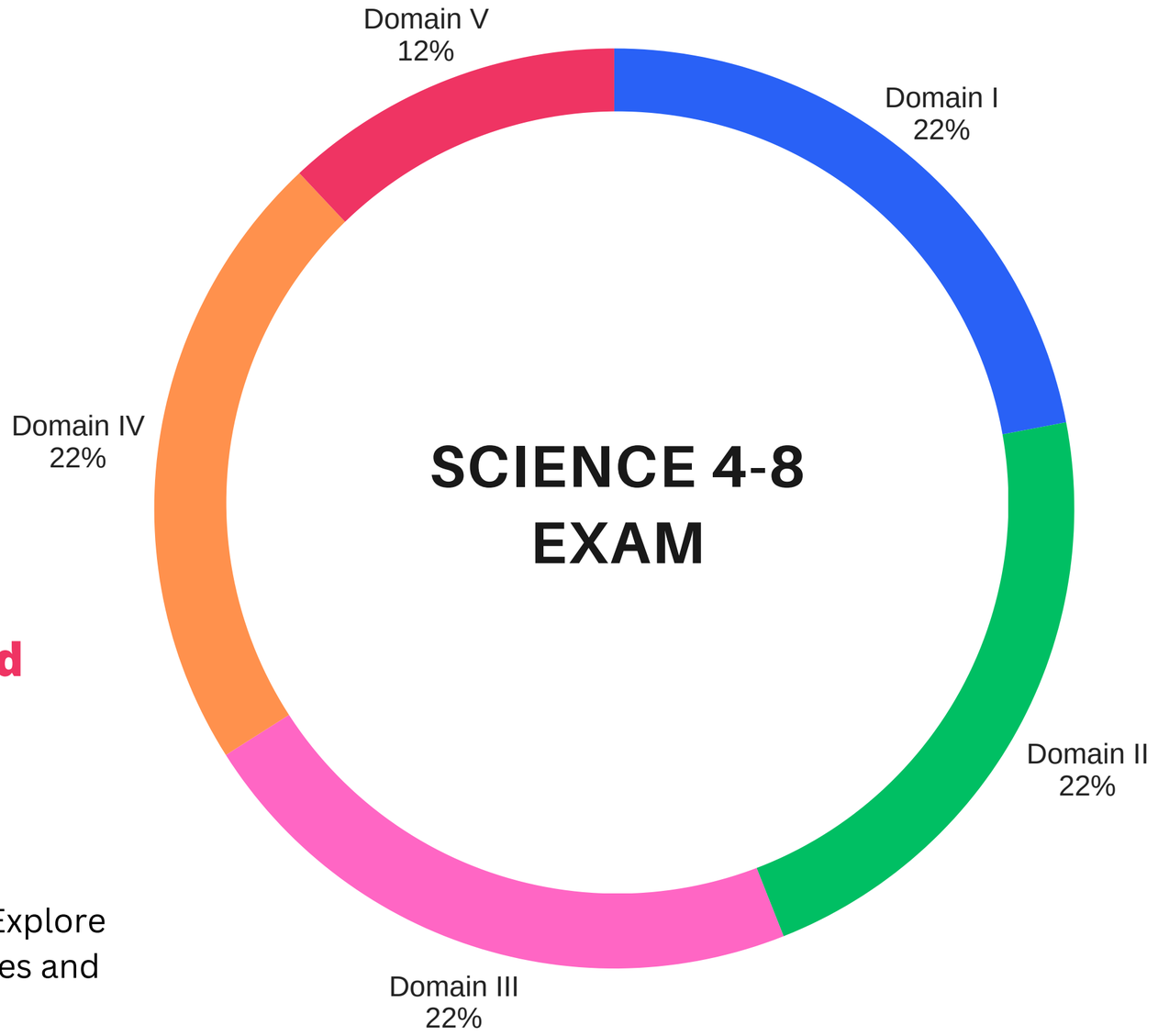
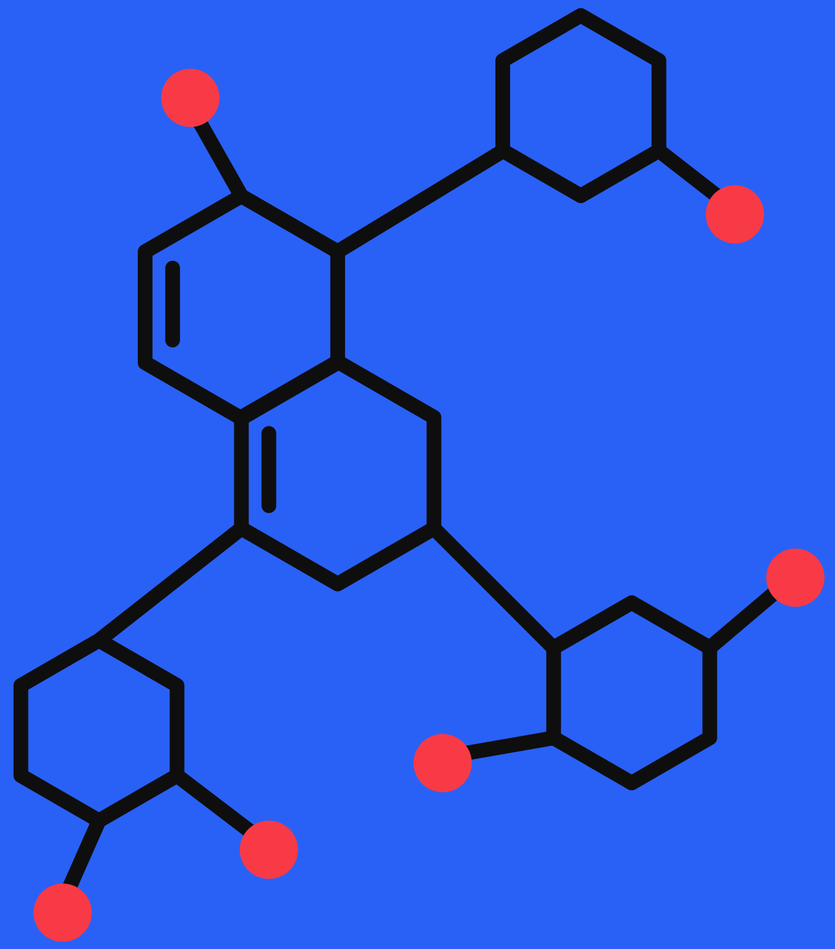


Each section is made up of a number of competencies. Explore each section to learn the breakdown of the competencies and understand the type of questions in that section.

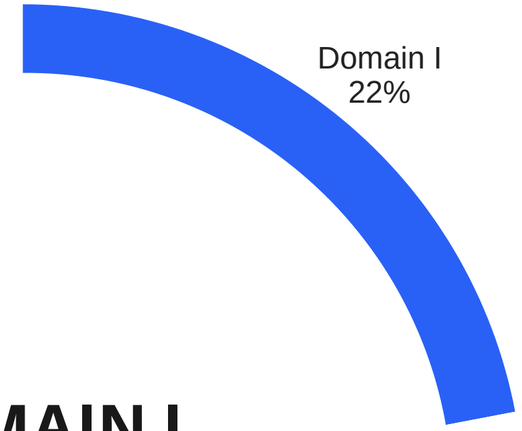
Domain I



Scientific Inquiry & Processes

Domain I Competencies

1. SAFETY AND LAB MANAGEMENT
2. TOOLS AND MEASUREMENT
3. SCIENTIFIC INQUIRY
4. SCIENCE AND SOCIETY
5. UNIFYING CONCEPTS AND PROCESSES



DOMAIN I

Scientific Inquiry and Processes

Safety and Lab Management

The teacher understands how to manage learning activities to ensure the safety of all students.

Overview of Competency 1

- Understands safety regulations and guidelines for science facilities and science instruction.
- Knows procedures for and sources of information regarding the appropriate handling, use, conservation, disposal, recycling, care and maintenance of chemicals, materials, specimens and equipment.
- Knows procedures for the safe handling and ethical care and treatment of organisms and specimens.

Tools and Measurement

The teacher understands the correct use of tools, materials, equipment and technologies.

Overview of Competency 2

- Selects and safely uses appropriate tools, technologies, materials and equipment needed for instructional activities.
- Understands concepts of precision, accuracy and error with regard to reading and recording numerical data from a scientific instrument.
- Understands how to gather, organize, display and communicate data in a variety of ways (e.g., construct charts, tables, graphs, maps, satellite images, diagrams, written reports, oral presentations).
- Understands the international system of measurement (i.e., metric system) and performs unit conversions within measurement systems.

Scientific Inquiry and Nature of Science

The teacher understands the process of scientific inquiry and the history and nature of science.

Overview of Competency 3

- Understand characteristics of various scientific investigations (descriptive studies, controlled experiments, data analysis)
- Design, conduct, and communicate results of scientific investigations using logical reasoning and empirical evidence
- Understand the historical development of science and contributions from diverse individuals and backgrounds
- Identify sources of error in investigations, use multiple trials for reliability, and defend inquiry-based results
- Develop, analyze, and evaluate different explanations for scientific results using peer review and scientific ethics

Science and Society

The teacher understands how science impacts the daily lives of students and interacts with and influences personal and societal decisions.

Overview of Competency 4

- Understand how ethical standards, economics, and societal needs influence scientific decisions
- Apply scientific principles to analyze personal choices concerning fitness, health, and substance use/abuse
- Understand population changes, natural resource use (renewable/non-renewable), and human consumption effects
- Use probability and scientific principles to evaluate advantages, disadvantages, and alternatives in decision-making
- Understand how science helps resolve personal, societal, and global challenges (recycling, alternative energy, product claims)

Unifying Concepts and Processes

The teacher understands how science impacts the daily lives of students and interacts with and influences personal and societal decisions.

Overview of Competency 5

- Understand how ethical standards, economics, and societal needs influence scientific decisions
- Apply scientific principles to analyze personal choices concerning fitness, health, and substance use/abuse
- Understand population changes, natural resource use (renewable/non-renewable), and human consumption effects
- Use probability and scientific principles to evaluate advantages, disadvantages, and alternatives in decision-making
- Understand how science helps resolve personal, societal, and global challenges (recycling, alternative energy, product claims)

Sample Question 1

During a lab investigating chemical reactions, a student spills a strong acid on their hand. Which action should be taken first?

A. Neutralize the acid with a weak base solution from the lab shelf
B. Flush the affected area with large amounts of water for at least 15 minutes
C. Apply a chemical burn cream before rinsing
D. Wipe off the acid with paper towels, then apply ice

Sample Question 1

Answer: B

Immediate and prolonged flushing with water (15-20 minutes) is the correct first response to chemical burns. Water dilutes and removes the acid, minimizing tissue damage.

Sample Question 2

A student measures the boiling point of water five times and records: 99.8°C, 100.1°C, 99.9°C, 105.2°C, and 100.0°C. Which statement best describes these measurements?

A. The measurements are both accurate and precise

B. The measurements are precise but not accurate

C. Four measurements are accurate and precise; one is an outlier

D. The measurements demonstrate systematic error in the thermometer

Sample Question 2

Answer: C

Four measurements cluster tightly around 100°C (the true boiling point), showing both precision (consistency) and accuracy (closeness to true value). The 105.2°C reading is an outlier—significantly different from the others and the known value. This could result from experimental error (incomplete submersion of thermometer, reading taken during rapid heating, contamination). Option A ignores the outlier. Option B would apply if all measurements clustered around an incorrect value. Option D would produce consistently high or low readings across all trials, not one anomalous value.

Sample Question 3

A teacher models population dynamics using a computer simulation showing predator-prey relationships over 50 years. Which statement best describes a limitation of this model?

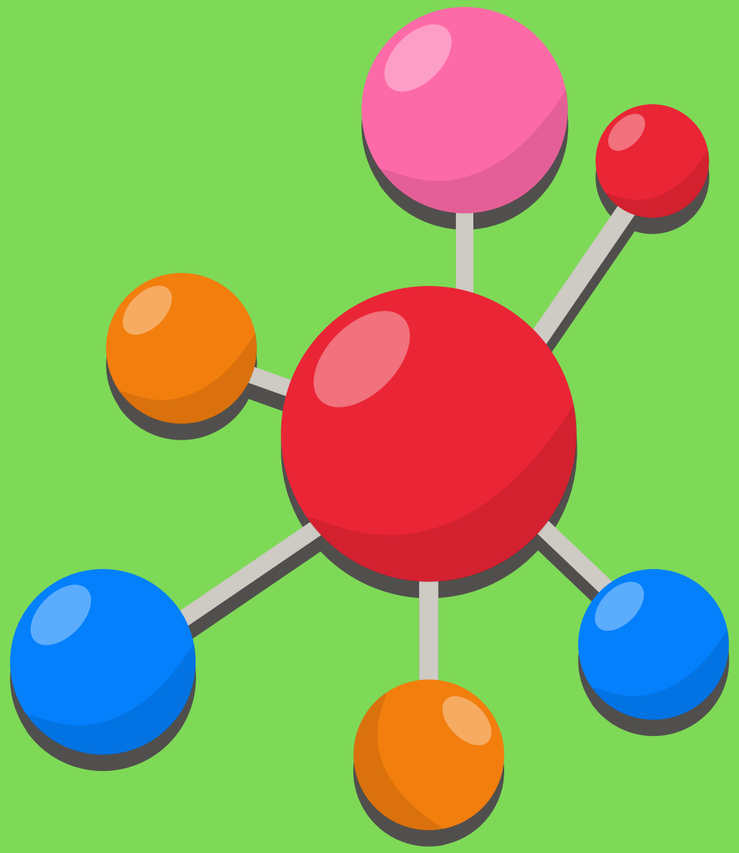
A. Models cannot generate quantitative data for analysis
B. The model simplifies complex ecosystem interactions and may not account for other factors
C. Computer simulations are less useful than physical models for understanding systems
D. The model only shows patterns over time and cannot make predictions

Sample Question 3

Answer: B

All models simplify reality to make complex systems understandable, but this means they have inherent limitations. A predator-prey model typically focuses on two populations and their direct interaction, but real ecosystems involve multiple species, diseases, climate variations, habitat changes, and other factors not included in simplified models. This is a fundamental limitation that must be recognized when evaluating model validity.

Domain II



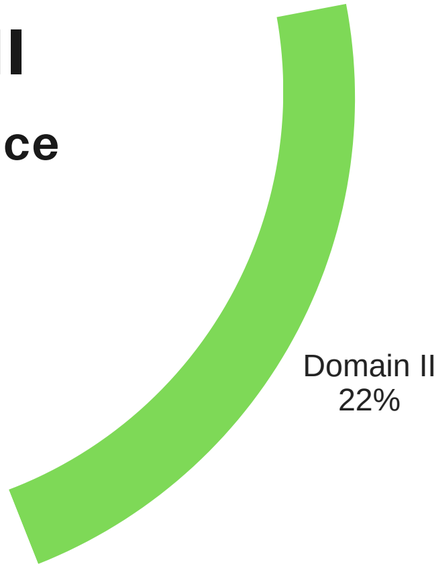
Physical Science

Domain II Competencies

6. FORCES AND MOTION
7. PHYSICAL PROPERTIES OF MATTER
8. CHEMICAL PROPERTIES AND REACTIONS
9. ENERGY AND MATTER INTERACTIONS
10. ENERGY TRANSFORMATIONS AND CONSERVATION

DOMAIN II

Physical Science



Forces and Motion

The teacher understands forces and motion and their relationships.

Overview of Competency 6

- Understand properties of universal forces (gravitational, electrical, magnetic)
- Measure, graph, and describe changes in motion using displacement, speed, velocity, and acceleration
- Understand the vector nature of force and identify forces acting on objects
- Apply Newton's laws to describe object motion in various situations (simple machines, blood flow, geologic processes)

Physical Properties of Matter

The teacher understands physical properties of and changes in matter.

Overview of Competency 7

- Describe physical properties of substances (density, boiling/melting points, solubility, conductivity, luster, malleability)
- Understand physical properties and molecular structure of solids, liquids, and gases
- Relate physical properties of elements to their placement in the periodic table (metals, non-metals, metalloids)
- Distinguish between physical and chemical changes in matter
- Apply knowledge of physical properties to life and earth/space science processes

Chemical Properties and Reactions

The teacher understands chemical properties of and changes in matter.

Overview of Competency 8

- Describe atomic structure and distinguish among elements, compounds, mixtures, and solutions
- Relate chemical properties of elements to their placement in the periodic table
- Understand chemical bonds, formulas, and analyze chemical reactions with equations
- Explain importance of chemical reactions in daily life (rusting, photosynthesis, respiration, digestion, burning fossil fuels)
- Understand applications in physical, life, and earth/space science and technology (materials science, biochemistry, medicine)

Calculus Foundations

The teacher understands energy and interactions between matter and energy.

Overview of Competency 9

- Describe concepts of work, power, and potential and kinetic energy
- Understand heat energy, temperature differences, and principles of electricity and magnetism
- Apply knowledge of light properties (reflection, refraction, dispersion) to optical systems and phenomena
- Understand properties, production, and transmission of sound
- Apply wave characteristics (wavelength, frequency, interference) to describe water, electromagnetic, and sound waves

Energy Conservation and Transformation

The teacher understands energy transformations and the conservation of matter and energy.

Overview of Competency 10

- Describe energy generation processes in the sun and stars
- Apply law of conservation of matter to various situations (water cycle, food chains, chemical equations)
- Understand energy sources and transformation processes (fossil fuels, solar, hydroelectric)
- Distinguish between exothermic and endothermic reactions and their applications
- Apply law of conservation of energy to physical phenomena (nuclear reactions, simple machines, collisions)

Sample Question 1

A 10 kg box is pushed across a floor with a force of 50 N but only accelerates at 3 m/s^2. According to Newton's second law (F = ma), the box should accelerate at 5 m/s^2. What best explains this discrepancy?

A. Newton's second law does not apply to objects on surfaces
B. Friction is acting opposite to the applied force, reducing net force to 30 N
C. The box's mass is actually greater than 10 kg
D. Gravitational force is reducing the horizontal acceleration

Sample Question 1

Answer: B

Newton's second law states that net force equals mass times acceleration ($F_{net} = ma$). The applied force is 50 N, but the actual acceleration is 3 m/s^2, giving a net force of 10 kg × 3 m/s^2 = 30 N. The difference (50 N - 30 N = 20 N) represents the force of friction opposing motion. This demonstrates understanding that multiple forces act on objects and only the net force determines acceleration. Option A is incorrect—Newton's laws apply universally. Option C would require different calculations and doesn't explain why applied force differs from net force. Option D confuses gravitational force (vertical) with horizontal motion; gravity affects normal force but doesn't directly reduce horizontal acceleration.

Sample Question 2

A student balances the combustion equation: $C_3H_8 + 5O_2 \rightarrow 3CO_2 + 4H_2O$. What principle does this balanced equation demonstrate?

A. Energy is always released during chemical reactions

B. The law of conservation of matter—atoms are neither created nor destroyed

C. Products always have greater mass than reactants

D. Chemical bonds are stronger in products than in reactants

Sample Question 2

Answer: B

A balanced chemical equation demonstrates the law of conservation of matter. Counting atoms on both sides: reactants have 3 carbon, 8 hydrogen, and 10 oxygen atoms; products have 3 carbon (in $3CO_2$), 8 hydrogen (in $4H_2O$), and 10 oxygen atoms (6 from $3CO_2$ + 4 from $4H_2O$). All atoms are accounted for—none created or destroyed. Option A is incorrect because not all reactions release energy (endothermic reactions absorb energy). Option C is false—mass is conserved in chemical reactions, not increased. Option D is irrelevant to balancing equations and isn't always true; bond strength varies by reaction type.

Sample Question 3

An athlete uses a cold pack that activates when squeezed, causing two chemicals to mix. The pack becomes cold to the touch. Which statement correctly describes this process?

A. The reaction violates conservation of energy because thermal energy disappears

B. The exothermic reaction releases cold energy into the environment

C. The chemicals create new energy in the form of coldness

D. The endothermic reaction absorbs heat from surroundings, converting thermal energy to chemical potential energy

Sample Question 3

Answer: D

Cold packs use endothermic reactions that absorb thermal energy from the surroundings (the athlete's skin and the pack itself), making the pack feel cold. Energy is conserved—thermal energy is converted to chemical potential energy in the products. The reaction needs energy input to proceed, drawing heat from the environment. Option A incorrectly suggests energy disappears, violating conservation of energy. Option C misidentifies the reaction type (exothermic releases heat, making things warm) and incorrectly refers to "cold energy"—cold is absence of thermal energy, not a form of energy itself. Option D violates conservation of energy by suggesting energy creation.

Domain III

Life Science

Domain III Competencies

11. STRUCTURE AND FUNCTION OF LIVING THINGS
12. REPRODUCTION AND HEREDITY
13. ADAPTIONS AND EVOLUTIONS
14. REGULATORY MECHANISMS AND BEHAVIOR
15. ORGANISMS AND ENVIRONMENT

DOMAIN III

Life Science

Structure and Function of Living Things

The teacher understands the structure and function of living things.

Overview of Competency 11

- Describe characteristics of organisms from major taxonomic groups (domains, kingdoms) and construct dichotomous keys
- Analyze how structure complements function in cells, tissues, organs, organ systems, and organisms (plants and animals)
- Identify human body systems and describe their functions (digestive, circulatory, etc.)
- Describe how organisms (producers, consumers, decomposers) obtain and use energy and matter
- Apply chemical principles to describe basic components of living things (proteins, carbohydrates, lipids, nucleic acids) and distinguish organic from inorganic compounds

Reproduction and Heredity

The teacher understands reproduction and the mechanisms of heredity.

Overview of Competency 12

- Compare and contrast sexual and asexual reproduction
- Understand organization of hereditary material (DNA, genes, chromosomes)
- Describe how traits are determined by one or many genes and how single genes can influence multiple traits
- Distinguish between dominant and recessive traits and predict genetic outcomes
- Evaluate influence of environmental and genetic factors on traits and understand applications of genetic research

Adaptions and Evolutions

The teacher understands adaptations of organisms and the theory of evolution.

Overview of Competency 13

- Describe similarities, differences, and classification methods among organisms (prokaryotic vs. eukaryotic)
- Identify traits that enhance survival and reproductive success in populations or species
- Describe how populations and species change through time
- Apply knowledge of evolution mechanisms (variation, mutation, environmental factors, natural selection)
- Describe evidence supporting the theory of evolution

Regulatory Mechanisms and Behavior

The teacher understands regulatory mechanisms and behavior.

Overview of Competency 14

- Describe how organisms respond to internal and external stimuli
- Apply knowledge of structures and physiological processes that maintain stable internal conditions
- Understand feedback mechanisms that allow organisms to maintain homeostasis
- Understand how evolutionary history affects behavior

Organisms and Environment

The teacher understands the relationships between organisms and the environment.

Overview of Competency 15

- Understand ecosystem organization levels (organism, population, community) and identify abiotic and biotic components
- Analyze interrelationships among producers, consumers, and decomposers (food chains, food webs)
- Identify factors influencing population size and growth, and analyze adaptive characteristics creating unique niches
- Describe and analyze energy flow through ecosystems
- Understand how populations modify ecosystems (succession) and how biodiversity affects ecosystem sustainability

Sample Question 1

In a grassland ecosystem, 10,000 kcal of energy is available in grass (producers). Approximately how much energy is typically available to hawks (tertiary consumers) that eat snakes (secondary consumers) that eat mice (primary consumers)?

A. 10,000 kcal
B. 1,000 kcal
C. 100 kcal
D. 10 kcal

Sample Question 1

Answer: D

Energy transfer through trophic levels follows the 10% rule—approximately 10% of energy is passed to the next level, with 90% lost as heat, metabolism, and waste. Starting with 10,000 kcal in producers: primary consumers (mice) receive ~1,000 kcal, secondary consumers (snakes) receive ~100 kcal, and tertiary consumers (hawks) receive ~10 kcal. This represents three energy transfers (10,000 → 1,000 → 100 → 10). Option A ignores energy loss between levels. Option B represents energy at the primary consumer level. Option C represents energy at the secondary consumer level.

Sample Question 2

A student examines cells under a microscope. Cell A has a rigid cell wall, chloroplasts, and a large central vacuole. Cell B has a flexible cell membrane, many mitochondria, and no cell wall. What can the student correctly conclude?

A. Cell A is prokaryotic with a cell wall; Cell B is eukaryotic with membrane-bound organelles
B. Cell A is a plant cell performing photosynthesis; Cell B is an animal cell obtaining energy from food
C. Cell A is a fungal cell with rigid structure; Cell B is a plant cell with flexible membranes
D. Cell A is a bacterial cell with peptidoglycan; Cell B is a protist cell with varied organelles

Sample Question 2

Answer: B

Cell A's characteristics (cell wall, chloroplasts, central vacuole) definitively indicate a plant cell. Chloroplasts enable photosynthesis, producing glucose from light energy. Cell B's features (flexible membrane, no cell wall, numerous mitochondria) indicate an animal cell that must consume organic molecules for energy. Option A is incorrect because both cells are eukaryotic—they contain membrane-bound organelles (chloroplasts and mitochondria). Option C is wrong because fungal cells lack chloroplasts and cannot photosynthesize; they're more similar to animal cells in obtaining nutrients. Option D is incorrect because bacterial cells are prokaryotic and completely lack organelles like chloroplasts and mitochondria; they have no membrane-bound structures.

Sample Question 3

In pea plants, tall (T) is dominant over short (t). Two heterozygous tall plants (Tt) are crossed. Their offspring include both tall and short plants. What explains the appearance of short plants in the offspring?

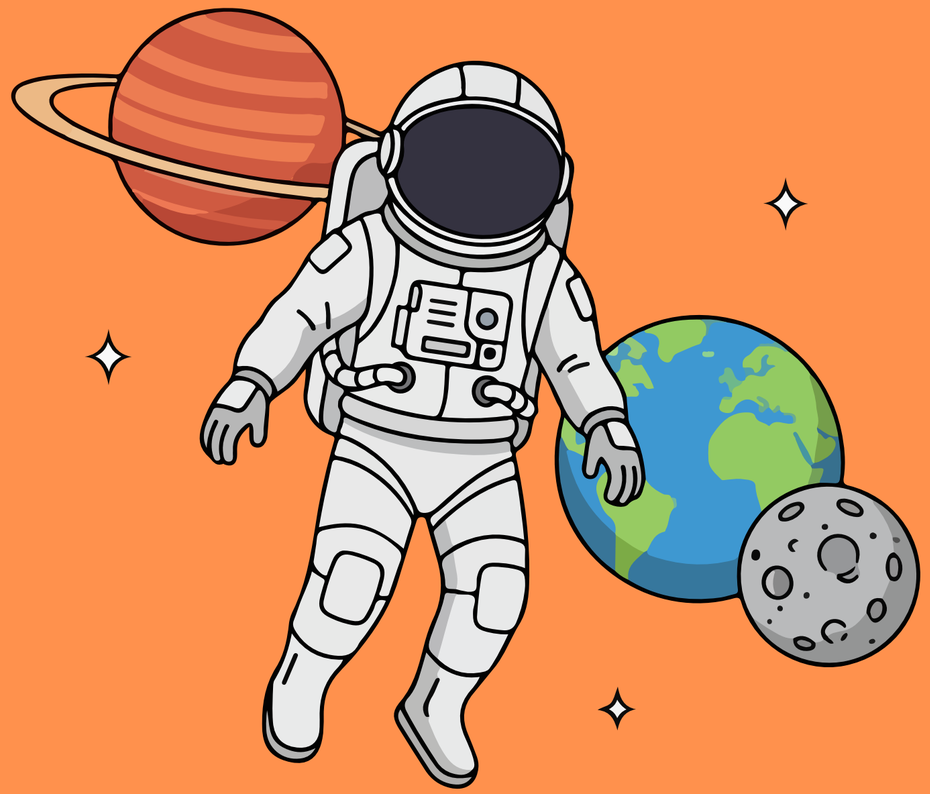
A. Environmental conditions triggered expression of the recessive height phenotype in some offspring
B. Incomplete dominance caused blending, producing intermediate heights interpreted as short plants
C. Each parent contributed a recessive t allele, producing homozygous recessive tt offspring
D. Random mutations during meiosis converted dominant T alleles to recessive t alleles

Sample Question 3

Answer: C

When two heterozygous plants (Tt × Tt) cross, Punnett square analysis shows 25% TT, 50% Tt, and 25% tt offspring. Short plants (tt) appear when both parents contribute their recessive t allele. Only homozygous recessive individuals (tt) express the recessive phenotype. Option A incorrectly suggests environmental control—in Mendelian genetics, height is genetically determined, not environmentally triggered. Option B describes incomplete dominance, which would produce intermediate heights in all heterozygotes, not the distinct tall/short categories observed in Mendel's experiments. Option D suggests mutation, but short plants result from normal segregation and recombination during sexual reproduction, not from new mutations.

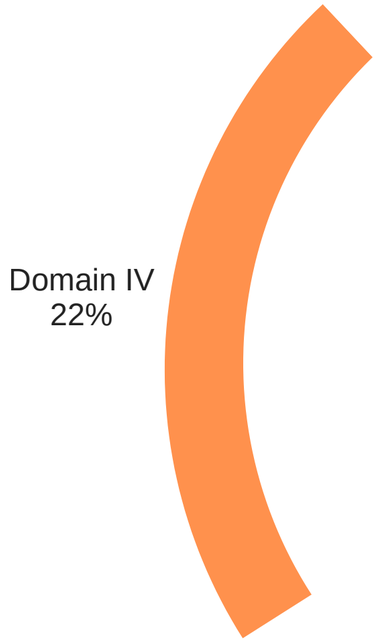
Domain IV



Earth and Space Science

Domain IV Competencies

16. EARTH SYSTEMS
17. CYCLES IN EARTH SYSTEMS
18. WEATHER AND CLIMATE
19. SOLAR SYSTEM AND UNIVERSE
20. EARTH'S HISTORY



DOMAIN IV

Earth & Space Science

Earth Systems

The teacher understands the structure and function of Earth systems.

Overview of Competency 16

- Understand Earth's layers, surface features (landforms), and use topographic maps and satellite imaging to analyze geologic change
- Understand form and function of surface and subsurface water (watersheds, aquifers)
- Apply knowledge of atmospheric composition, structure, properties, and characteristics that support life
- Understand interactions among biosphere, geosphere, hydrosphere, and atmosphere
- Identify energy sources in Earth systems (solar, geothermal, wind, hydroelectric, biofuels) and energy transfer mechanisms (conduction, convection, radiation)

Cycles in Earth Systems

The teacher understands cycles in Earth systems.

Overview of Competency 17

- Understand the rock cycle and formation of rocks, minerals, fossil fuels, and soils
- Understand the water cycle, its relationship to weather processes, and sun-ocean interactions
- Understand nutrient cycles (carbon, nitrogen) and their relationship to Earth systems
- Apply knowledge of how human and natural processes affect Earth systems
- Understand dynamic interactions among cycles in the biosphere, geosphere, hydrosphere, and atmosphere

Weather and Climate

The teacher understands the role of energy in weather and climate.

Overview of Competency 18

- Understand weather elements (humidity, wind speed, pressure, temperature) and their measurement
- Compare and contrast weather and climate
- Analyze weather charts and data to make predictions based on local and global patterns
- Apply knowledge of energy transfers among Earth systems that affect weather and climate
- Analyze how Earth's position, orientation, and surface features affect weather and climate

Solar System and the Universe

The teacher understands the characteristics of the solar system and the universe.

Overview of Competency 19

- Understand properties and characteristics of celestial objects
- Apply knowledge of Earth–moon–sun system and their interactions (seasons, lunar phases, eclipses)
- Identify properties of solar system components, including systems that allow life to exist
- Recognize characteristics of stars, nebulae, and galaxies and their distribution in the universe
- Understand scientific theories of the origin of the universe

Earth’s History

The teacher understands the history of the Earth system.

Overview of Competency 20

- Understand the scope of geologic time scale and its relationship to geologic processes
- Understand theories about Earth's origin and geologic history
- Understand how tectonic forces have shaped landforms over time
- Understand fossil formation and the importance of the fossil record in explaining Earth's history

Sample Question 1

Plants absorb carbon dioxide during photosynthesis and release it during respiration. Animals consume plants and release carbon dioxide through respiration. What role do decomposers play in completing the carbon cycle?

A. Decomposers convert atmospheric carbon dioxide into oxygen that plants and animals use for respiration
B. Decomposers break down dead organisms, releasing carbon dioxide back to the atmosphere and soil
C. Decomposers absorb carbon from the soil and convert it into glucose for consumer organisms
D. Decomposers store carbon permanently in sedimentary rocks, removing it from the active carbon cycle

Sample Question 1

Answer: B

Decomposers (bacteria, fungi) break down dead plant and animal matter through cellular respiration, releasing stored carbon as CO_2 back to the atmosphere and returning nutrients to soil. This completes the carbon cycle by recycling carbon from dead biomass. Option A incorrectly describes decomposer function—they release CO_2, not convert it to oxygen; photosynthesis in plants converts CO_2 to oxygen. Option C reverses the process—decomposers break down complex organic compounds into simpler forms, not build glucose. Option D describes long-term geological sequestration, not the biological role of decomposers in the active carbon cycle.

Sample Question 2

A coastal city experiences mild temperatures year-round (average 15-20°C), while an inland city at the same latitude has extreme temperature variations (-10°C in winter to 35°C in summer). What best explains this difference?

A. The coastal city receives more direct sunlight throughout the year due to lower elevation levels

B. Ocean water has high specific heat, absorbing and releasing thermal energy slowly, moderating temperatures

C. Prevailing winds always blow from ocean to land, carrying consistent temperatures to coastal areas

D. The inland city has lower atmospheric pressure, causing greater temperature fluctuations throughout seasons

Sample Question 2

Answer: B

Water's high specific heat capacity means it heats and cools much more slowly than land. Oceans absorb heat during summer without large temperature increases and release stored heat during winter, preventing extreme cold. This moderates coastal temperatures year-round. Option A is incorrect—latitude determines solar angle and sunlight intensity, not elevation; both cities are at the same latitude. Option C oversimplifies wind patterns—winds don't always blow one direction, and this doesn't explain the fundamental temperature moderation mechanism. Option D is incorrect—atmospheric pressure differences don't directly cause seasonal temperature extremes; pressure systems affect weather patterns but don't explain the coastal-inland temperature contrast.

Sample Question 3

During a lunar eclipse, Earth passes between the sun and moon, casting a shadow on the moon. During a solar eclipse, the moon passes between the sun and Earth, blocking sunlight. Why are solar eclipses visible from only small areas while lunar eclipses are visible from entire hemispheres?

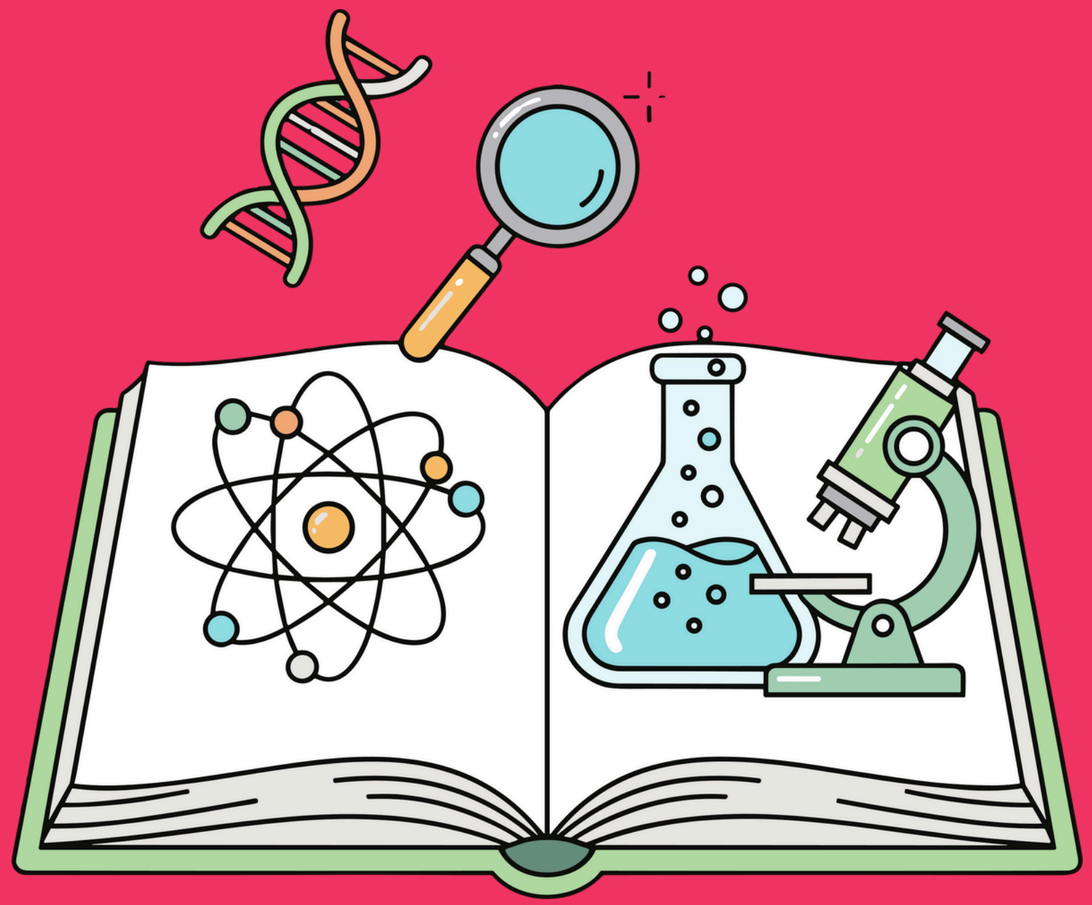
A. The moon's shadow on Earth is much smaller than Earth's shadow on the moon
B. Solar eclipses occur during daytime when fewer observers are available to view them
C. The moon's orbit is tilted, causing solar eclipses to occur only at specific latitudes
D. Earth rotates faster than the moon orbits, limiting solar eclipse visibility to narrow paths

Sample Question 3

Answer: A

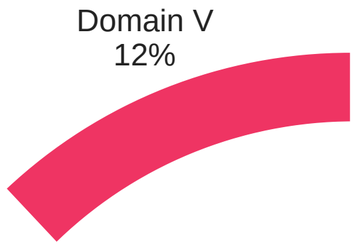
The moon is much smaller than Earth, so its shadow cone (umbra) creates a small circular shadow on Earth's surface, typically 100-200 km wide. Only observers within this narrow path see totality. Earth's much larger shadow easily encompasses the entire moon during lunar eclipses, making them visible from anywhere on Earth's night side (entire hemisphere). Option B addresses observation logistics, not the physical reason for visibility differences—even if observed, solar eclipses remain geographically limited. Option C incorrectly explains eclipse visibility—orbital tilt affects eclipse frequency, not the size of visibility zones. Option D confuses rotation with shadow size—while Earth's rotation moves the shadow path, the fundamental issue is the moon's small shadow diameter.

Domain V



Science Learning, Instruction, and Assessment

Domain V Competencies



21. SCIENCE LEARNING AND TEACHING

22. INQUIRY-BASED INSTRUCTION

23. SCIENCE ASSESSMENT

DOMAIN V

Science Learning, Instruction, and Assessment

Science Learning and Teaching

The teacher has theoretical and practical knowledge about teaching science and about how students learn science.

Overview of Competency 21

- Understand how student characteristics, prior knowledge, and attitudes influence science learning
- Select and adapt curricula and materials to meet needs of all students, including English-language learners
- Address common science misconceptions and use questioning strategies for higher-level thinking
- Plan inclusive, sequenced activities using active learning and inquiry processes

Inquiry-Based Instruction

The teacher understands the process of scientific inquiry and its role in science instruction.

Overview of Competency 22

- Plan and implement nonexperimental and experimental inquiry investigations with relevant questions
- Instruct students in safe use of tools, equipment, and technology for systematic data collection
- Promote critical thinking and scientific problem-solving to reach evidence-based conclusions
- Teach students to analyze explanations, identify error sources, and communicate/defend results

Science Assessment

The teacher knows the varied and appropriate assessments and assessment practices to monitor science learning in laboratory, field and classroom settings.

Overview of Competency 23

- Understand relationships among curriculum, assessment, and instruction to inform teaching decisions
- Use varied formative and summative assessments to monitor student understanding and progress
- Evaluate student performance through multiple methods (projects, portfolios, rubrics, self-assessment)
- Share evaluation criteria and assessment results with students

Sample Question 1

Students investigate whether temperature affects seed germination rates. After collecting data, most groups conclude temperature has no effect, but their procedures varied significantly. What should the teacher prioritize in the follow-up discussion?

A. Provide the correct answer about optimal germination temperatures and have students revise their conclusions
B. Guide students to identify uncontrolled variables and discuss how procedural inconsistencies affect reliability
C. Have students repeat the experiment exactly as written in the lab manual
D. Focus on proper graphing techniques to improve data visualization and interpretation

Sample Question 1

Answer: B

This addresses multiple inquiry competencies: identifying error sources, understanding how inconsistent procedures affect reliability, and developing critical analysis skills. Guiding students to recognize that uncontrolled variables (water amount, light exposure, soil type, temperature measurement methods) caused unreliable results teaches scientific reasoning more effectively than simply providing answers. Students learn that conclusions must be supported by reliable evidence from controlled investigations.

Sample Question 2

A teacher plans a unit on plate tectonics for a class including English-language learners at varying proficiency levels. Which instructional approach best supports content learning for all students?

A. Provide translated worksheets in students' native languages while teaching the lesson in English
B. Simplify content by focusing on vocabulary and basic definitions of plate boundaries
C. Use multiple representations (animations, physical models, diagrams) with sentence frames for discussion
D. Pair English-language learners with fluent English speakers so that they can help with translation from the teacher

Sample Question 2

Answer: C

Multiple representations make abstract concepts (plate movement, subduction, continental drift) accessible through visual, kinesthetic, and verbal modalities, supporting comprehension for all learners regardless of language proficiency. Sentence frames scaffold academic language production while maintaining high cognitive expectations. This approach addresses both content and language development simultaneously without lowering academic rigor.

Additional Resources

Breakdown of Science 4-8 Test 116

Thank You

TutoringEZ