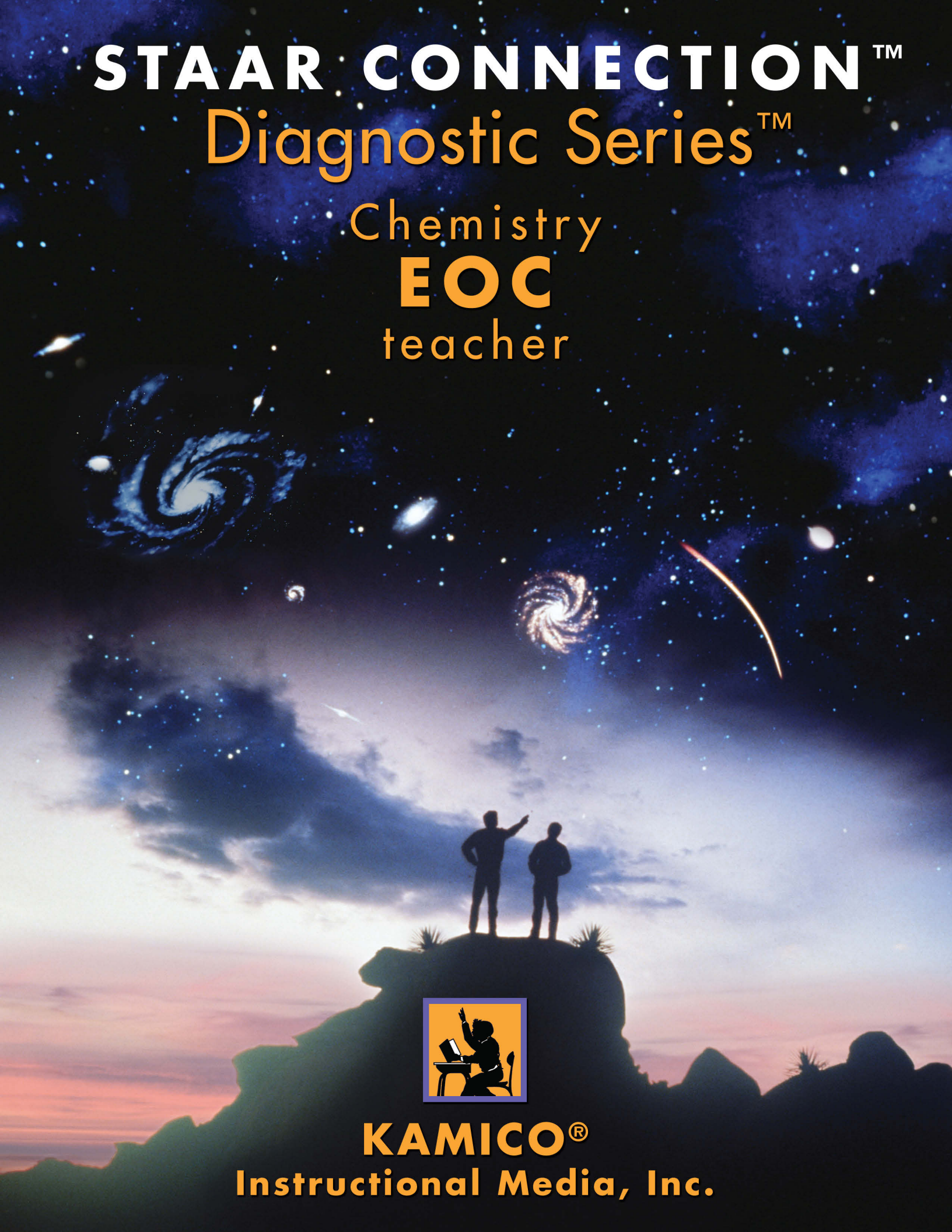
STAAR CONNECTION™

Diagnostic Series™

Chemistry

EOC

teacher



KAMICO®
Instructional Media, Inc.

STAAR CONNECTION™

EOC Chemistry

Teacher Edition

Diagnostic Series™

III/iii/MMXII
XXIII/iv/MMXII
Version 1

KAMICO®
Instructional Media, Inc.

P.O. Box 1143
Salado, Texas 76571
Telephone: 254.947.7283 Fax: 254.947.7284
E-mail: info@kamico.com Website: www.kamico.com

KAMICO® Instructional Media, Inc.
STAAR CONNECTION™
Introduction

KAMICO® Instructional Media's program is validated by scientifically based research. **STAAR CONNECTION™ Diagnostic Series™** and **Developmental Series™** can be used in tandem to ensure mastery of Texas reporting categories and TEKS. The *Diagnostic Series™* consists of a bank of assessments. Each assessment covers a mixture of reporting categories and TEKS. This research-based format provides continual reinforcement for and ensures retention of mastered concepts. To take full advantage of this series, administer an assessment to students. After they have completed the assessment, use it as an instructional tool. Go over each item with the class, discussing all correct and incorrect answers. Then, use the assessment as a diagnostic tool to determine a standard for which students need remediation. Find that standard in the *Developmental Series™*.

Each book in the *Developmental Series™* consists of isolated activities and assessments to allow for the development of specific TEKS. For every TEKS, there is at least one individual or group activity. The activities provide a fun, challenging, yet nonthreatening, way to develop mastery of the TEKS. In addition to these activities, each *Developmental Series™* book has assessments on isolated standards to be used to identify mastery or the need for further skill development or reinforcement. Continue to alternate between the *STAAR CONNECTION™ Diagnostic Series™* and the *Developmental Series™*.

KAMICO's **DATA CONNECTION®** software prints student answer sheets on plain paper using a standard laser printer, scans answer sheets using a TWAIN-compliant scanner, scores assessments, and disaggregates student academic data, showing which goals and objectives are mastered and which goals and objectives are in need of reinforcement. The software is preprogrammed to work with all KAMICO® assessments. It is easily customized to work with other instructional materials and assessments as well as teacher-, school-, district-, or state-created assessments. DATA CONNECTION® analyzes academic data from individual students, classes, grade levels, and demographic groups. Reports are presented in tabular and graphic form. Item analysis is provided to help determine the most effective method of instruction.

KAMICO® Instructional Media, Inc., supports efforts to ensure adequate yearly progress and eliminate surprises in high-stakes test results.

© 2012
KAMICO® Instructional Media, Inc.
P.O. Box 1143
Salado, Texas 76571
Telephone: 254.947.7283 Fax: 254.947.7284

KAMICO® Instructional Media, Inc.
STAAR CONNECTION™
Diagnostic Series™
EOC Chemistry
Table of Contents

Reporting Categories and Related TEKS 7

Assessment 1 15
Assessment 2 20
Assessment 3 25
Assessment 4 30
Assessment 5 35
Assessment 6 40
Assessment 7 45
Assessment 8 50
Assessment 9 55
Assessment 10 60
Assessment 11 65
Assessment 12 70
Assessment 13 75
Assessment 14 80
Assessment 15 85
Assessment 16 90
Assessment 17 95
Assessment 18 100
Assessment 19 105
Assessment 20 110

Answer Key 115
Student Bubble Answer Sheet 130
Bubble Answer Key 139

TEKS Alignment Chart 148
Student Progress Chart 159

Letter to Parents 160
Test-Taking Tips 161
Strategies for Reducing Your Students' Test Anxiety 162

STAAR Chemistry Reference Materials 163

KAMICO Product Information 167

State of Texas Assessment of Academic Readiness
Chemistry Assessment
Eligible Texas Essential Knowledge and Skills

Reporting Category 1:
Matter and the Periodic Table

The student will demonstrate an understanding of the properties of matter and the periodic table.

(C.4) **Science concepts.** The student knows the characteristics of matter and can analyze the relationships between chemical and physical changes and properties. The student is expected to

(A) differentiate between physical and chemical changes and properties; ***Readiness Standard***

(B) identify extensive and intensive properties; ***Supporting Standard***

(C) compare solids, liquids, and gases in terms of compressibility, structure, shape, and volume; and ***Supporting Standard***

(D) classify matter as pure substances or mixtures through investigation of their properties. ***Readiness Standard***

(C.5) **Science concepts.** The student understands the historical development of the Periodic Table and can apply its predictive power. The student is expected to

(A) explain the use of chemical and physical properties in the historical development of the Periodic Table; ***Supporting Standard***

(B) use the Periodic Table to identify and explain the properties of chemical families, including alkali metals, alkaline earth metals, halogens, noble gases, and transition metals; and ***Readiness Standard***

(C) use the Periodic Table to identify and explain periodic trends, including atomic and ionic radii, electronegativity, and ionization energy. ***Readiness Standard***

Reporting Category 2:
Atomic Structure and Nuclear Chemistry

The student will demonstrate an understanding of atomic theory and nuclear chemistry.

(C.6) **Science concepts.** The student knows and understands the historical development of atomic theory. The student is expected to

(A) understand the experimental design and conclusions used in the development of modern atomic theory, including Dalton's Postulates, Thomson's discovery of electron properties, Rutherford's nuclear atom, and Bohr's nuclear atom; ***Supporting Standard***

(B) understand the electromagnetic spectrum and the mathematical relationships between energy, frequency, and wavelength of light; ***Supporting Standard***

(C) calculate the wavelength, frequency, and energy of light using Planck's constant and the speed of light; ***Supporting Standard***

(D) use isotopic composition to calculate average atomic mass of an element; and ***Supporting Standard***

(E) express the arrangement of electrons in atoms through electron configurations and Lewis valence electron dot structures. ***Readiness Standard***

(C.12) **Science concepts.** The student understands the basic processes of nuclear chemistry. The student is expected to

(A) describe the characteristics of alpha, beta, and gamma radiation; ***Supporting Standard***

(B) describe radioactive decay process in terms of balanced nuclear equations; and ***Readiness Standard***

(C) compare fission and fusion reactions. ***Supporting Standard***

Reporting Category 3:
Bonding and Chemical Reactions

The student will demonstrate an understanding of how atoms form bonds and can qualify the changes that occur during chemical reactions.

(C.7) **Science concepts.** The student knows how atoms form ionic, metallic, and covalent bonds. The student is expected to

(A) name ionic compounds containing main group or transition metals, covalent compounds, acids, and bases, using International Union of Pure and Applied Chemistry (IUPAC) nomenclature rules; ***Readiness Standard***

(B) write the chemical formulas of common polyatomic ions, ionic compounds containing main group or transition metals, covalent compounds, acids, and bases; ***Readiness Standard***

(C) construct electron dot formulas to illustrate ionic and covalent bonds; ***Readiness Standard***

(D) describe the nature of metallic bonding and apply the theory to explain metallic properties such as thermal and electrical conductivity, malleability, and ductility; and ***Supporting Standard***

(E) predict molecular structure for molecules with linear, trigonal planar, or tetrahedral electron pair geometries using Valence Shell Electron Pair Repulsion (VSEPR) theory. ***Supporting Standard***

(C.8) **Science concepts.** The student can quantify the changes that occur during chemical reactions. The student is expected to

(A) define and use the concept of a mole; ***Supporting Standard***

(B) use the mole concept to calculate the number of atoms, ions, or molecules in a sample of material; ***Readiness Standard***

(C) calculate percent composition and empirical and molecular formulas; ***Supporting Standard***

(D) use the law of conservation of mass to write and balance chemical equations; and Readiness Standard (E) perform stoichiometric calculations, including determination of mass relationships between reactants and products, calculation of limiting reagents, and percent yield. ***Supporting Standard***

(E) perform stoichiometric calculations, including determination of mass relationships between reactants and products, calculation of limiting reagents, and percent yield. ***Supporting Standard***

Reporting Category 4: Gases and Thermochemistry

The student will demonstrate an understanding of the conditions that influence the behavior of gases and the energy changes that occur in chemical reactions.

(C.9) **Science concepts.** The student understands the principles of ideal gas behavior, kinetic molecular theory, and the conditions that influence the behavior of gases. The student is expected to

(A) describe and calculate the relations between volume, pressure, number of moles, and temperature for an ideal gas as described by Boyle's law, Charles' law, Avogadro's law, Dalton's law of partial pressure, and the ideal gas law; ***Readiness Standard***

(B) perform stoichiometric calculations, including determination of mass and volume relationships between reactants and products for reactions involving gases; and ***Supporting Standard***

(C) describe the postulates of kinetic molecular theory. ***Supporting Standard***

(C.11) **Science concepts.** The student understands the energy changes that occur in chemical reactions. The student is expected to

(A) understand energy and its forms, including kinetic, potential, chemical, and thermal energies; ***Supporting Standard***

(B) understand the law of conservation of energy and the processes of heat transfer; ***Supporting Standard***

(C) use thermochemical equations to calculate energy changes that occur in chemical reactions and classify reactions as exothermic or endothermic; ***Readiness Standard***

(D) perform calculations involving heat, mass, temperature change, and specific heat; and ***Supporting Standard***

(E) use calorimetry to calculate the heat of a chemical process. ***Supporting Standard***

Reporting Category 5:
Solutions

The student will demonstrate an understanding of solutions and can apply the factors that influence the behavior of solutions.

(C.10) **Science concepts.** The student understands and can apply the factors that influence the behavior of solutions. The student is expected to

(A) describe the unique role of water in chemical and biological systems; ***Supporting Standard***

(B) develop and use general rules regarding solubility through investigations with aqueous solutions; ***Readiness Standard***

(C) calculate the concentration of solutions in units of molarity; ***Supporting Standard***

(D) use molarity to calculate the dilutions of solutions; ***Supporting Standard***

(E) distinguish between types of solutions such as electrolytes and nonelectrolytes and unsaturated, saturated, and supersaturated solutions; ***Readiness Standard***

(F) investigate factors that influence solubilities and rates of dissolution such as temperature, agitation, and surface area; ***Readiness Standard***

(G) define acids and bases and distinguish between Arrhenius and Bronsted-Lowry definitions and predict products in acid-base reactions that form water; ***Supporting Standard***

(H) understand and differentiate among acid-base reactions, precipitation reactions, and oxidation-reduction reactions; ***Readiness Standard***

(I) define pH and use the hydrogen or hydroxide ion concentrations to calculate the pH of a solution; and ***Supporting Standard***

(J) distinguish between degrees of dissociation for strong and weak acids and bases. ***Supporting Standard***

Scientific Process Skills

These skills will not be listed under a separate reporting category. Instead, they will be incorporated into at least 40% of the test questions from reporting categories 1–5 and will be identified along with content standards.

(C.1) **Scientific processes.** The student, for at least 40% of instructional time, conducts laboratory and field investigations using safe, environmentally appropriate, and ethical practices. The student is expected to

(A) demonstrate safe practices during laboratory and field investigations, including the appropriate use of safety showers, eyewash fountains, safety goggles, and fire extinguishers;

(B) know specific hazards of chemical substances such as flammability, corrosiveness, and radioactivity as summarized on the Material Safety Data Sheets (MSDS); and

(C) demonstrate an understanding of the use and conservation of resources and the proper disposal or recycling of materials.

(C.2) **Scientific processes.** The student uses scientific methods to solve investigative questions. The student is expected to

(A) know the definition of science and understand that it has limitations, as specified in chapter 112.35, subsection (b)(2) of 19 TAC;

(B) know that scientific hypotheses are tentative and testable statements that must be capable of being supported or not supported by observational evidence. Hypotheses of durable explanatory power which have been tested over a wide variety of conditions are incorporated into theories;

(C) know that scientific theories are based on natural and physical phenomena and are capable of being tested by multiple independent researchers. Unlike hypotheses, scientific theories are well-established and highly-reliable explanations, but may be subject to change as new areas of science and new technologies are developed;

(D) distinguish between scientific hypotheses and scientific theories;

(E) plan and implement investigative procedures, including asking questions, formulating testable hypotheses, and selecting equipment and technology, including graphing calculators, computers and probes, sufficient scientific glassware such as beakers, Erlenmeyer flasks, pipettes, graduated cylinders, volumetric flasks, safety goggles, and burettes, electronic balances, and an adequate supply of consumable chemicals;

(F) collect data and make measurements with accuracy and precision;

(G) express and manipulate chemical quantities using scientific conventions and mathematical procedures, including dimensional analysis, scientific notation, and significant figures;

(H) organize, analyze, evaluate, make inferences, and predict trends from data; and

(I) communicate valid conclusions supported by the data through methods such as lab reports, labeled drawings, graphs, journals, summaries, oral reports, and technology-based reports.

(C.3) **Scientific processes.** The student uses critical thinking, scientific reasoning, and problem solving to make informed decisions within and outside the classroom. The student is expected to

(A) in all fields of science, analyze, evaluate, and critique scientific explanations by using empirical evidence, logical reasoning, and experimental and observational testing, including examining all sides of scientific evidence of those scientific explanations, so as to encourage critical thinking by the student;

(B) communicate and apply scientific information extracted from various sources such as current events, news reports, published journal articles, and marketing materials;

(C) draw inferences based on data related to promotional materials for products and services;

(D) evaluate the impact of research on scientific thought, society, and the environment;

(E) describe the connection between chemistry and future careers; and

(F) research and describe the history of chemistry and contributions of scientists.

Name _____ Date _____

1 Which statement describes a physical property of bromine?

A Its formula is C_2H_5OH.

B It combines with aluminum to produce $AlBr_3$.

C It conducts electricity.

D It is a liquid at room temperature.

2 Elements on the modern Periodic Table are arranged in order of increasing —

F atomic number.

G atomic mass.

H number of valence electrons.

J number of neutrons.

3 Calculate the frequency of a quantity of energy with radiant energy of 6.22×10^{-19} Joules.

A $1.24 \times 10^{14}\ s^{-1}$

B $9.38 \times 10^{14}\ s^{-1}$

C $9.87 \times 10^{14}\ s^{-1}$

D $9.62 \times 10^{15}\ s^{-1}$

4 Ions of transition metals sometimes have more than one common iconic charge. In these cases, how is the numerical value of the charge indicated?

F a Roman numeral following the name

G a prefix

H a suffix

J a superscript after the name

5 How many molecules are in 3.50 moles of H_2O?

A 2.10×10^{24} molecules

B 8.02×10^{23} molecules

C 350 molecules

D 3.00 molecules

6 Energy can be transformed from molecule to molecule in a gas by collisions, but the average kinetic energy will remain constant if —

F the pressure remains constant.

G the volume remains constant.

H the temperature remains constant.

J the molar mass remains constant.

7 Which of the following statements about water is **not** true?

A Water is a polar molecule.

B Water easily dissolves methanol.

C Water expands when it freezes.

D Water easily dissolves sodium chloride.

8 Predict the missing product in the following reaction.

$$H_3PO_4 + 3NH_4OH \rightarrow 3\ H_2O + \_\_\_\_\_$$

F NH_4PO_4

G $3NH_4PO_4$

H $(NH_4)_3PO_4$

J $(NH_4)_2PO_4$

9 A pair of students is conducting an experiment when one is splashed with a hot fluid. The first thing that the lab partner should do is —

A take the partner to the safety shower.

B get the partner out of wet clothes.

C wrap the partner in the fire blanket.

D alert their teacher.

10 Scientists collect data, observe, experiment, and develop hypotheses, but their ultimate goal is to find —

F general theories that explain a variety of observations.

G an answer to the ultimate question.

H what still needs to be known.

J what other scientists have missed.

STAAR CONNECTION™
Diagnostic Series™ EOC Chemistry
TEKS Alignment Chart

NOTE:
TEA advises that the Scientific Process Skills "will be incorporated into at least 40% of the test questions in reporting categories 1-4 and will be identified along with content standards." KAMICO® has followed these guidelines. However, to ensure thorough coverage of the Scientific Investigation and Reasoning Skills, KAMICO® writers have included extra questions over just those skills to ensure student mastery.

For each grade or course, TEA has identified some of the TEKS eligible to be assessed on STAAR as readiness standards. These readiness standards will be emphasized on the STAAR assessments. The remaining TEKS eligible to be assessed on STAAR are considered supporting standards. Although supporting standards will be assessed, they will not be emphasized on STAAR. KAMICO® has shown whether each question assessed in this book is aligned to a readiness standard or a supporting standard.

Readiness standards

- are essential for success in the current grade or course,
- are important for preparedness for the next grade or course,
- support college and career readiness,
- necessitate in-depth instruction, and
- address broad and deep ideas.

Supporting standards, although introduced in the current grade or course,

- may be emphasized in a subsequent year,
- may be emphasized in a previous year,
- play a role in preparing students for the next grade or course but not a central role, and
- address more narrowly defined ideas.

Assessment 1					
Question Number	**Answer**	**Reporting Category**	**TEKS**	**Readiness or Supporting Standard**	**Process Skill**
1	D	1	C.4A	Readiness	
2	F	1	C.5A	Supporting	C.3F
3	B	2	C.6C	Supporting	C.2G
4	F	3	C.7A	Readiness	
5	A	3	C.8B	Readiness	C.2G
6	H	4	C.9C	Supporting	
7	B	5	C.10A	Supporting	
8	H	5	C.10G	Supporting	
9	D	Process Skill	C.2A	Process Skill	C.2A
10	F	Process Skill	C.1A	Process Skill	C.1A