Food Science

Subject: Career and Technical Education
Grade: 11

7. Scientific decision making is a way of answering questions about the natural world involving its own set of ethical standards about how the process of science should be carried out. Students should be able to distinguish between scientific decision-making methods (scientific methods) and ethical and social decisions that involve science (the application of scientific information).

8. Science consists of recurring themes and making connections between overarching concepts. Recurring themes include systems, models, and patterns. All systems have basic properties that can be described in space, time, energy, and matter. Change and constancy occur in systems as patterns and can be observed, measured, and modeled. These patterns help to make predictions that can be scientifically tested, while models allow for boundary specification and provide a tool for understanding the ideas presented. Students should analyze a system in terms of its components and how these components relate to each other, to the whole, and to the external environment.

9. Students are encouraged to participate in extended learning experiences such as career and technical student organizations and other leadership or extracurricular organizations.

10. Statements that contain the word "including" reference content that must be mastered, while those containing the phrase "such as" are intended as possible illustrative examples.

(b) Knowledge and Skills Statements

(1) The student demonstrates professional standards/employability skills as required by business and industry. The student is expected to

(A) demonstrate professional standards/employability skills such as demonstrating good attendance, punctuality, and ethical conduct; meeting deadlines, and working toward personal and team goals.

(i) demonstrate professional standards

(ii) demonstrate employability skills

(2) The student, for at least 40% of instructional time, asks questions, identifies problems, and plans and safely conducts classroom, laboratory, and field investigations to answer questions, explain phenomena, or design solutions using appropriate tools and models. The student is expected to

(A) ask questions and define problems based on observations or information from text, phenomena, models, or investigations

(i) ask questions based on observations or information from text, phenomena, models, or investigations

(ii) define problems based on observations or information from text, phenomena, models, or investigations

(B)

(C) use appropriate safety equipment and practices during laboratory, classroom, and field investigations as outlined in Texas Education Agency-approved safety standards

(i) use appropriate safety equipment during laboratory investigations as outlined in Texas Education Agency-approved safety standards

(ii) use appropriate safety equipment during classroom investigations as outlined in Texas Education Agency-approved safety standards

(iii) use appropriate safety equipment during field investigations as outlined in Texas Education Agency-approved safety standards

(iv) use appropriate safety practices during laboratory investigations as outlined in Texas Education Agency-approved safety standards

(v) use appropriate safety practices during classroom investigations as outlined in Texas Education Agency-approved safety standards

(vi) use appropriate safety practices during field investigations as outlined in Texas Education Agency-approved safety standards

(D) use appropriate tools and equipment such as scientific calculators, computers, internet access, digital cameras, video recording devices, meter sticks, metric rulers, measuring tapes, digital range finders, protractors, calipers, light microscopes up to 100x magnification, hand lenses, stereoscopes, digital scales, dissection equipment, standard laboratory glassware, appropriate personal protective equipment (PPE), an adequate supply of consumable chemicals, biological specimens, prepared evidence slides and samples, evidence packaging and tamper evident tape, evidence tents, crime scene tape, L-rulers, American Board of Forensic Odontology (ABFO) scales, alternate light sources (ALS) and ALS protective goggles, blood specimens, blood presumptive tests, glass samples of various chemical composition, human and non-human bones, fingerprint brushes and powders, lifting tapes and cards, ten-print cards and ink pads, swabs with containers, disposable gloves, and relevant and necessary kits

(i) use appropriate tools

(ii) use appropriate equipment

(E) collect quantitative data with accuracy and precision using the International System of Units (SI) and United States customary units and qualitative data as evidence

(i) collect quantitative data with accuracy using the International System of Units (SI)

(ii) collect quantitative data with precision using the International System of Units (SI)

(iii) collect quantitative data with accuracy using United States customary units

(iv) collect quantitative data with precision using United States customary units

(v) collect qualitative data as evidence

(F) organize quantitative and qualitative data using appropriate methods of communication such as reports, graphs, tables, or charts

(i) organize quantitative data using appropriate methods of communication

(ii) organize qualitative data using appropriate methods of communication

(G) develop and use models to represent phenomena, systems, processes, or solutions to engineering problems

(i) develop models to represent phenomena, systems, processes, or solutions to engineering problems

(ii) use models to represent phenomena, systems, processes, or solutions to engineering problems

(H) distinguish between scientific hypotheses, theories, and laws

(i) distinguish between scientific hypotheses, theories, and laws

(3) The student analyzes and interprets data to derive meaning, identify features and patterns, and discover relationships or correlations to develop evidence-based arguments or evaluate designs. The student is expected to

(A) identify advantages and limitations of models such as their size, scale, properties, and materials

(i) identify advantages of models

(ii) identify limitations of models

(B) analyze data by identifying significant statistical features, patterns, sources of error, and limitations

(i) analyze data by identifying significant statistical features

(ii) analyze data by identifying patterns

(iii) analyze data by identifying sources of error

(iv) analyze data by identifying limitations

(C) use mathematical calculations to assess quantitative relationships in data

(i) use mathematical calculations to assess quantitative relationships in data

(D) evaluate experimental and engineering designs.

(i) evaluate experimental designs

(ii) evaluate engineering designs

(4) The student develops evidence-based explanations and communicates findings, conclusions, and proposed solutions. The student is expected to

(A) develop explanations and propose solutions supported by data and models and consistent with scientific ideas, principles, and theories

(i) develop explanations supported by data and consistent with scientific ideas

(ii) develop explanations supported by data and consistent with scientific principles

(iii) develop explanations supported by data and consistent with scientific theories

(iv) develop explanations supported by models and consistent with scientific ideas

(v) develop explanations supported by models and consistent with scientific principles

(vi) develop explanations supported by models and consistent with scientific theories

(vii) propose solutions supported by data and consistent with scientific ideas

(viii) propose solutions supported by data and consistent with scientific principles

(ix) propose solutions supported by data and consistent with scientific theories

(x) propose solutions supported by models and consistent with scientific ideas

(xi) propose solutions supported by models and consistent with scientific principles

(xii) propose solutions supported by models and consistent with scientific theories

(B)

(ix) critique scientific explanations by using empirical evidence so as to encourage critical thinking by the student

(x) critique scientific explanations by using logical reasoning so as to encourage critical thinking by the student

(xi) critique scientific explanations by using experimental testing so as to encourage critical thinking by the student

(xii) critique scientific explanations by using observational testing so as to encourage critical thinking by the student

(B) relate the impact of past and current research on scientific thought and society, including research methodology, cost-benefit analysis, and contributions of diverse scientists and engineers as related to the content

(i) relate the impact of past research on scientific thought, including research methodology

(ii) relate the impact of past research on scientific thought, including cost-benefit analysis

(iii) relate the impact of past research on scientific thought, including contributions of diverse scientists as related to the content

(iv) relate the impact of past research on scientific thought, including contributions of diverse engineers as related to the content

(v) relate the impact of past research on society, including research methodology

(vi) relate the impact of past research on society, including cost-benefit 1(o)-43.9 (rTc 0.004 Tw 2.048 0 Td[()3 (a(p).2 (t

(D)

(9) The student recognizes the procedures of crime scene investigation while maintaining scene integrity. The student is expected to

(A) explain the roles and tasks needed to complete a crime scene examination, which may require collaboration with outside experts and agencies, and demonstrate the ability to work as a member of a crime scene team

(i) explain the roles needed to complete a crime scene examination, which may require collaboration with outside experts and agencies

(ii) explain the tasks needed to complete a crime scene examination, which may require collaboration with outside experts and agencies

(iii) demonstrate the ability to work as a member of a crime scene team

(B) develop a detailed, technical written record based on observations and activities, documenting the crime scene examination

(i) develop a detailed, technical written record based on observations, documenting the crime scene examination

(ii) develop a detailed, technical written record based on activities, documenting the crime scene examination

(C) discuss the elements of criminal law that guide search and seizure of persons, property, and evidence

(i) discuss the elements of criminal law that guide search and seizure of persons

(ii) discuss the elements of criminal law that guide search and seizure of property

(iii) discuss the elements of criminal law that guide search and seizure of evidence

(D) conduct a primary and secondary systematic search of a simulated crime scene for physical evidence utilizing search patterns such as spiral, line, grid, and zone

(i) conduct a primary systematic search of a simulated crime scene for physical evidence utilizing search patterns

(ii) conduct a secondary systematic search of a simulated crime scene for physical evidence utilizing search patterns

(E) document a crime scene using photographic or audiovisual equipment

(i) document a crime scene using photographic or audiovisual equipment

(F) generate a physical or digital crime scene sketch, including coordinates or measurements from fixed points, compass directions, scale of proportion, legend-key, heading, and title block

(i) generate a physical or digital crime scene sketch, including coordinates or measurements from fixed points

(ii) generate a physical or digital crime scene sketch, including compass directions

(iii) generate a physical or digital crime scene sketch, including scale of proportion

(iv) generate a physical or digital crime scene sketch, including legend-key

(v) generate a physical or digital crime scene sketch, including heading

(vi) generate a physical or digital crime scene sketch, including title block

(G) demonstrate proper techniques for collecting, packaging, and preserving physical evidence found at a crime scene

(11)

(D) describe and illustrate the different microscopic characteristics used to determine the origin of a human hair sample

(i) describe the different microscopic characteristics used to determine the origin of a human hair sample

(ii) illustrate the different microscopic characteristics used to determine the origin of a human hair sample

(E) differentiate between natural and synthetic fibers.

(i) differentiate between natural and synthetic fibers.

(13) The student recognizes the methods to process and analyze glass evidence. The student is expected to

(A)

(15) The student evaluates firearms and ballistics evidence. The student is expected to

(A) describe the mechanism of modern firearms such as long guns and handguns

(i) describe the mechanism of modern firearms

(B) identify the components and characteristics of bullet and cartridge cases

(i) identify the components of bullet cases

(ii) identify the components of cartridge cases

(iii)

(17) The student explores toxicology in forensic science. The student is expected to

(A) explain the absorption, distribution, metabolization, and elimination of toxins such as alcohol, prescription drugs, controlled substances, and carbon monoxide through the human body

(i) explain the absorption of toxins through the human body

(ii) explain the distribution of toxins through the human body

(iii) explain the metabolization of toxins through the human body

(iv) explain the elimination of toxins through the human body

(B) describe presumptive and confirmatory laboratory procedures as they relate to toxicological analysis such as head space analysis, solid-phase extractions, gas chromatography-mass spectrometry (GC/MS), color tests, and immunoassays

(i) describe presumptive laboratory procedures as they relate to toxicological analysis

(ii) describe confirmatory laboratory procedures as they relate to toxicological analysis

(C) interpret results from presumptive and confirmatory laboratory procedures, including GC/MS and their implications

(i) interpret results from presumptive laboratory procedures, including GC/MS

(ii) interpret results from presumptive laboratory procedures, including [the results'] implications

(iii)

(19) The student analyzes the foundations and methodologies surrounding the processing of biological evidence for the purpose of identification. The student is expected to

(A) identify different types of biological samples and practice proper collection and preservation techniques

(i)

(B)