Figure: 19 TAC §74.6(c)

College and Career Readiness Standards / Texas Essential Knowledge and Skills Alignment

Science

CCRS	Foundation Subjects		Enrichment
	Science	Social Studies	CTE
I. Nature of Science: Scientific Ways of Learning and Thinking			
A. Cognitive skills in science			
I.A.1. Utilize skepticism, logic, and professional ethics in science.	Grades 3-12: (3)(A) Aquatic Science: (2)(A), (2)(D), (3)(A) Astronomy: (2)(A), (2)(D), (3)(A) Biology: (2)(A), (2)(D), (3)(A) Chemistry: (2)(A), (2)(D), (3)(A) Earth and Space Science: (2)(A), (2)(D), (3)(A) Environmental Systems: (2)(A), (2)(D), (3)(A), (9)(G)-(I) IPC: (2)(A), (3)(A) Physics: (2)(A), (2)(D), (3)(A)		Anatomy and Physiology: (3)(B), (4)(A), (6)(C) Advanced Animal Science: (3)(B), (4)(A), (6)(A)-(B), (13)(A) Advanced Plant and Soil Science: (3)(B), (4)(A), (9)(B), (10)(B), (10)(E), (11)(D), (18)(D) Medical Microbiology: (3)(B), (4)(A), (7)(F) Pathophysiology: (3)(B), (4)(A) Engineering Design and Problem Solving: (3)(B), (4)(A), (5)(A), (5)(D)-(E), (6)(F), (8)(A)-(C), (8)(E)-(H), (9(G)-(H) Engineering Science: (3)(B), (4)(A), (6)(B)-(C), (9)(B), (13)(D)-(E) Scientific Research and Design: (3)(B), (4)(A) Principles of Technology: (3)(B), (3)(I), (4)(A), (5)(G) Biotechnology I: (3)(B), (4)(A) Biotechnology II: (3)(B), (4)(A), (5)(B), (8)(C), (9)(C), (10)(B) Forensic Science: (3)(B), (4)(A), (6)(C), (12)(D) Food Science: (3)(B), (4)(A)
I.A.2. Use creativity and insight to recognize and describe patterns in natural phenomena.	Kindergarten-Grade 2: (3)(B) Grades 3-8: (2)(D) Grade 7: (5)(A)-(C) Grade 8: (7)(A)-(B), (10)(B) Aquatic Science: (2)(B) Astronomy: (2)(B), (4)(C) Biology: (2)(B) Chemistry: (2)(B) Earth and Space Science: (2)(B) Environmental Systems: (2)(B), (4)(D) IPC: (4)(A) Physics: (2)(B)		Anatomy and Physiology: (4)(A)-(D), (6)(C), (10)(A)-(B), (12)(B)-(C) Advanced Animal Science: (4)(A)-(D) Advanced Plant and Soil Science: (4)(A)-(D), (9)(B), (10)(B), (10)(E), (15)(E) Medical Microbiology: (4)(A)-(D), (6)(A), (6)(D), (7)(B), (7)(F) Pathophysiology: (4)(A)-(D) Engineering Design and Problem Solving: (4)(A)-(D), (5)(A), (5)(D), (6)(F), (8)(A)-(C), (8)(E)-(H) Engineering Science: (4)(A)-(D) Scientific Research and Design: (4)(A)-(D) Principles of Technology: (4)(A)-(D) Biotechnology I: (4)(A)-(D) Biotechnology II: (4)(A)-(D), (6)(C), (9)(A), (13)(B) Forensic Science: (4)(A)-(D), (5)(A), (6)(A), (6)(C)-(D), (6)(F), (6)(J), (14)(A), (16)(C), (17)(C) Food Science: (4)(A)-(D)
I.A.3. Formulate appropriate questions to test understanding of natural phenomena.	Kindergarten-Grade 8: (2)(A) Grades 5-8: (2)(B) Aquatic Science: (2)(E) Astronomy: (2)(E) Biology: (2)(E) Chemistry: (2)(E) Environmental Systems: (2)(E) IPC: (2)(B) Physics: (2)(E)		Anatomy and Physiology: (3)(B), (3)(E), (10)(B), (11)(A) Advanced Animal Science: (3)(B), (3)(E) Advanced Plant and Soil Science: (3)(B), (3)(E), (7)(A), (9)(B), (10)(B), (10)(E) Medical Microbiology: (3)(B), (3)(E), (6)(D), (7)(F); Pathophysiology: (3)(B), (3)(E) Engineering Design and Problem Solving: (3)(B), (3)(E), (5)(A), (5)(D), (6)(F), (8)(A)-(C), (8)(E)-(H) Engineering Science: (3)(B), (3)(E) Scientific Research and Design: (3)(B), (3)(E) Principles of Technology: (3)(B), (3)(E) Biotechnology I: (3)(B), (3)(E) Biotechnology II: (3)(B), (3)(E), (7)(C) Forensic Science: (3)(B), (3)(E), (16)(C) Food Science: (3)(B), (3)(E)
I.A.4. Rely on reproducible observations of empirical evidence when constructing, analyzing, and evaluating explanations of natural events and processes.	Kindergarten-Grade 5: (2)(D) Grades 3-4: (2)(B) Grade 5: (2)(C) Grades 6-8: (2)(A)-(B), (2)(D)-(E), (3)(A) Aquatic Science: (2)(C), (3)(A), (5)(A) Astronomy: (2)(C), (2)(G), (3)(A) Biology: (2)(C), (2)(G), (3)(A) Chemistry: (2)(C), (2)(H), (3)(A) Earth and Space Science: (2)(C), (2)(G), (3)(A) Environmental Systems: (2)(C), (2)(I), (3)(A), (9)(F) IPC: (2)(D), (3)(A) Physics: (2)(C), (2)(J), (3)(A)		Anatomy and Physiology: (3)(B)-(C), (3)(E), (3)(G), (4)(A)-(D), (10)(A)-(B), (11)(A), (12)(B)-(C) Advanced Animal Science: (3)(B)-(C), (3)(E), (3)(G), (4)(A)-(D) Advanced Plant and Soil Science: (3)(B)-(C), (3)(E), (3)(G), (4)(A)-(D), (7)(A), (7)(C), (9)(B), (10)(B), (10)(E) Medical Microbiology: (3)(B)-(C), (3)(E), (3)(G), (4)(A)-(D), (6)(C)-(D), (7)(F) Pathophysiology: (3)(B)-(C), (3)(E), (3)(G), (4)(A)-(D) Engineering Design and Problem Solving: (3)(B)-(C), (3)(E), (3)(G), (4)(A)-(D), (5)(A), (5)(D), (6)(F), (8)(A)-(C), (8)(E)-(H), (9)(A), (9)(G)-(H) Engineering Science: (3)(B)-(C), (3)(E), (3)(G), (4)(A)-(D), (6)(B)-(C), (13)(D)-(E) Scientific Research and Design: (3)(B)-(C), (3)(E), (3)(G), (4)(A)-(D), (6)(D), (9)(A) Principles of Technology: (2)(J), (3)(B)-(C), (3)(E), (3)(G), (4)(A)-(D), (5)(B) Biotechnology I: (3)B)-(C), (3)(E), (3)(G), (4)(A)-(D) Biotechnology II: (3)(B)-(C), (3)(E), (3)(G), (4)(A)-(D), (6)(D), (9)(B), (12)(C), (13)(B) Forensic Science: (3)(B)-(C), (3)(E), (3)(G), (4)(A)-(D) Food Science: (3)(B)-(C), (3)(E), (3)(G), (4)(A)-(D)

B. Scientific inquiry			
I.B.1. Design and conduct scientific investigations in which hypotheses are formulated and tested.	Kindergarten-Grade 8: (2)(A)-(B) Kindergarten-Grade 3: (2)(C) Aquatic Science: (2)(E) Astronomy: (2)(E) Biology: (2)(E) Chemistry: (2)(E) Environmental Systems: (2)(E) IPC: (2)(B) Physics: (2)(E)		Anatomy and Physiology: (3)(B), (3)(D)-(E) Advanced Animal Science: (3)(B), (3)(D)-(E), (5)(A), (5)(E) Advanced Plant and Soil Science: (3)(B), (3)(D)-(E), (5)(A), (5)(E), (7)(A), (8)(A), (10)(E), (18)(D) Medical Microbiology: (3)(B), (3)(D)-(E), (6)(D) Pathophysiology: (3)(B), (3)(D)-(E) Engineering Design and Problem Solving: (3)(B), (3)(D)-(E), (8)(B)-(C), (8)(F), (9)(A)-(B) Engineering Science: (3)(B), (3)(D)-(E), (7)(F), (10)(A), (11)(A), (12)(A), (12)(C) Scientific Research and Design: (3)(B), (3)(D)-(E), (5)(B), (7)(B)-(D) Principles of Technology: (3)(B), (3)(D)-(E), (5)(A), (5)(C) Biotechnology I: (3)(B), (3)(D)-(E) Biotechnology II: (3)(B), (3)(D)-(E), (7)(D), (14)(D) Forensic Science: (3)(B), (3)(D)-(E), (13)(B) Food Science: (3)(B), (3)(D)-(E)
C. Collaborative and safe working practices			
I.C.1. Collaborate on joint projects.	Aquatic Science: (2)(F) Astronomy: (2)(H)		Anatomy and Physiology: (1)(B) Advanced Animal Science: (5)(E) Advanced Plant and Soil Science: (5)(E) Medical Microbiology: (1)(B) Pathophysiology: (1)(B) Engineering Design and Problem Solving: (1)(B), (9)(C)-(D) Engineering Science: (1)(B), (6)(A), (6)(E) Scientific Research and Design: (1)(B) Principles of Technology: (1)(B) Biotechnology I: (1)(B) Biotechnology II: (1)(B), (7)(A) Forensic Science: (1) Food Science: (1)(B)
I.C.2. Understand and apply safe procedures in the laboratory and field, including chemical, electrical, and fire safety and safe handling of live or preserved organisms.	Kindergarten-Grade 12: (1)(A) Kindergarten-Grade 8 : (1)(B) Kindergarten-Grade 2: (1)(C) Grades 6-8: (4)(B) Aquatic Science: (1)(A) Astronomy: (1)(A) Biology: (1)(A) Chemistry: (1)(A) Earth and Space Science: (1)(A) Environmental Systems: (1)(A) IPC: (1)(A) Physics: (1)(A)		Anatomy and Physiology: (2)(A)-(B), (3)(E) Advanced Animal Science: (1)(C), (2)(A)-(B), (3)(E), (5)(E), (7)(D), (14)(C) Advanced Plant and Soil Science: (1)(C), (2)(A)-(B), (3)(E), (5)(E), (7)(A), (15)(D), (18)(D) Medical Microbiology: (2)(A)-(B), (3)(E), (3)(J) Pathophysiology: (2)(A)-(B), (3)(E) Engineering Design and Problem Solving: (2)(A)-(B), (3)(E), (8)(D), (9)(B), (9)(D)-(E) Engineering Science: (2)(A)-(B), (3)(E), (7)(F), (10)(A), (11)(A), (12)(A), (12)(C) Scientific Research and Design: (2)(A)-(B), (3)(E) Principles of Technology: (2)(A)-(B), (3)(E), (5)(D), (6)(A)-(D) Biotechnology I: (2)(A)-(B), (3)(E), (3)(J), (9)(A), (9)(C)-(E), (11)(A)-(B), (12)(B)-(I), (13)(A)-(B) Biotechnology II: (2)(A)-(B), (3)(E), (3)(J), (14)(A)-(B) Forensic Science: (2)(A)-(B), (3)(E), (3)(J), (6)(C)-(D), (6)(J), (12)(D), (16)(C) Food Science: (2)(A)-(B), (3)(E), (3)(J)
I.C.3. Demonstrate skill in the safe use of a wide variety of apparatuses, equipment, techniques, and procedures.	Kindergarten-Grade 12: (1)(A)-(B) Kindergarten-Grade 2: (2)(B) Kindergarten-Grade 8: (4)(A) Grades 5-8: (2)(B) Grades 6-8: (4)(B) Aquatic Science: (1)(B), (2)(E),(G) Astronomy:(2)(E)-(F), (2)(I), (11)(F) Biology: (1)(A)-(B), (2)(F) Chemistry: (1)(A), (1)(C), (2)(E)-(F) Earth and Space Science: (1)(A)-(C), (2)(E)-(F) Environmental Systems: (1)(B), (2)(F)-(H) IPC: (1)(A)-(B), (2)(B) Physics: (1)(A)-(B), (2)(F)-(G)		Anatomy and Physiology: (2)(A)-(B), (3)(E)-(F) Advanced Animal Science: (1)(C), (2)(A)-(B), (3)(E)-(F), (5)(E), (7)(D), (14)(C) Advanced Plant and Soil Science: (1)(C), (2)(A)-(B), (3)(E)-(F), (5)(E), (7)(A), (15)(D), (18)(D) Medical Microbiology: (2)(A)-(B), (3)(E)-(F), (3)(J) Pathophysiology: (2)(A)-(B), (3)(E)-(F), (6)(A) Engineering Design and Problem Solving: (2)(A)-(B), (3)(E)-(F), (9)(B), (9)(D)-(E) Engineering Science: (2)(A)-(B), (3)(E)-(F), (7)(F), (10)(A), (11)(A), (12)(A), (12)(C) Scientific Research and Design: (2)(A)-(B), (3)(E)-(F) Principles of Technology: (2)(A)-(B), (3)(E)-(F), (5)(D), (6)(A)-(D) Biotechnology I: (2)(A)-(B), (3)(E)-(F), (3)(J), (11)(A)-(B), (12)(B)-(I), (13)(A)-(B) Biotechnology II: (2)(A)-(B), (3)(E)-(F), (3)(J), (14)(A)-(B) Forensic Science: (2)(A)-(B), (3)(E)-(F), (6)(D), (6)(H), (6)(J), (8)(D), (12)(D), (14)(C), (16)(C) Food Science: (2)(A)-(B), (3)(E)-(F), (3)(J)
D. Current scientific technology			
I.D.1. Demonstrate literacy in computer use.	Kindergarten-Grade 8: (4)(A) Biology: (2)(F) Chemistry: (2)(F) Earth and Space Science: (1)(C), (2)(E) Environmental Systems: (2)(G)-(H) Physics: (2)(F)		Anatomy and Physiology: (3)(H) Advanced Animal Science: (3)(H), (13)(D) Advanced Plant and Soil Science: (3)(H) Medical Microbiology: (3)(H) Pathophysiology: (3)(H) Engineering Design and Problem Solving: (3)(H), (6)(C) Engineering Science: (3)(H), (13)(A)-(C) Scientific Research and Design: (3)(H), (8)(C), (10)(A) Principles of Technology: (3)(H) Biotechnology I: (3)(H) Biotechnology II: (3)(H) Forensic Science: (3)(H) Food Science: (3)(H) Introduction to Culinary Arts: (5)(A); Culinary Arts (10)(A-D)

I.D.2. Use computer models, applications, and simulations.	Kindergarten-Grade 8: (4)(A) Biology: (2)(F), (2)(H) Chemistry: (2)(F), (2)(I) Earth and Space Science: (1)(C), (2)(E), (15)(B) Environmental Systems: (2)(H) Physics: (2)(F), (2)(K)		Anatomy and Physiology: (3)(H) Advanced Animal Science: (3)(H), (13)(D) Advanced Plant and Soil Science: (3)(H) Medical Microbiology: (3)(H) Pathophysiology: (3)(H) Engineering Design and Problem Solving: (3)(H), (6)(C)-(D) Engineering Science: (3)(H), (13)(A)-(C) Scientific Research and Design: (3)(H), (8)(C), (10)(A) Principles of Technology: (2)(K), (3)(H) Biotechnology I: (3)(H), (7)(A) Biotechnology II: (3)(H) Forensic Science: (3)(H) Food Science: (3)(H)
I.D.3. Demonstrate appropriate use of a wide variety of apparatuses, equipment, techniques, and procedures for collecting quantitative and qualitative data.	Kindergarten-Grade 2: (2)(B) Kindergarten-Grade 5: (4)(A)-(B) Grades 3-5: (3)(C) Grades 6-8: (2)(B), (4)(A) Aquatic Science: (2)(E), (2)(G) Astronomy: (2)(E), (14)(C)-(D) Biology: (2)(E)-(F) Chemistry: (2)(E)-(F), (2)(I) Earth and Space Science: (2)(E)-(F) Environmental Systems: (2)(E), (2)(G)-(H) IPC: (2)(B), (4)(C)-(D) Physics: (2)(F)-(G), (2)(K)		Anatomy and Physiology: (3)(E)-(F) Advanced Animal Science: (3)(E)-(F) Advanced Plant and Soil Science: (3)(E)-(F), (7)(A), (18)(D) Medical Microbiology: (3)(E)-(F) Pathophysiology: (3)(E)-(F), (6)(A) Engineering Design and Problem Solving: (3)(E)-(F), (5)(J), (6)(A), (8)(I) Engineering Science: (3)(E)-(F), (10)(A), (11)(A) Scientific Research and Design: (3)(E)-(F), (8)(C), (10)(A) Principles of Technology: (2)(K), (3)(E)-(F), (5)(D)-(E) Biotechnology I: (3)(E)-(F) Biotechnology II: (3)(E)-(F) Forensic Science: (3)(E)-(F), (7)(A), (7)(E), (14)(A) Food Science: (3)(E)-(F)
E. Effective communication of scientific information			
I.E.1. Use several modes of expression to describe or characterize natural patterns and phenomena. These modes of expression include narrative, numerical, graphical, pictorial, symbolic, and kinesthetic.	Kindergarten: (8)(A), (8)(C) Kindergarten-Grade 2: (2)(E), (3)(A)-(B) Kindergarten-Grade 4: (2)(D) Grade 1: (6)(B) Grade 2: (2)(F), (8)(D) Grade 3: (8)(C), (9)(A), (9)(C), Grades 3-5: (2)(F), (3)(C) Grade 4: (2)(C), (6)(C), (8)(B), (9)(B), (10)(B) Grade 5: (2)(G), (6)(B)-(C), (8)(B)-(C), (9)(B), (10)(C) Grades 6-8: (2)(D)-(E), (3)(B) Grade 6: (8)(B), (8)(D), (10)(D), (11)(A), (11)(C), (12)(E)-(F) Grade 7: (5)(B)-(C), (11)(B), (12)(A) Grade 8: (10)(B) Aquatic Science: (2)(H), (8)(A), (8)(C), (10)(B) Astronomy: (2)(H), (8)(B), (10)(C), (12)(A), (14)(E) Biology: (2)(H), (4)(B)-(C), (5)(A), (5)(C), (6)(A), (6)(C), (10)(A)-(B), (11)(A), (11)(D), (12)(E) Chemistry: (2)(I), (7)(D), (10)(A) Earth and Space Science: (2)(I), (4)(B), (9)(D), (10)(B)-(C), (11)(B), (12)(B), (14)(C), (15)(A), (15)(D) Environmental Systems: (2)(K), (4)(H), (6)(B)-(D), (8)(A)-(B), (8)(D), (9)(D) IPC: (2)(E), (4)(B), (4)(F), (7)(E)-(F) Physics: (2)(J)-(L), (4)(A), (5)(A)-(C), (5)(G), (6)(E), (6)(G), (7)(A), (8)(A)-(C)		Anatomy and Physiology: (3)(F), (3)(H), (4)(B), (4)(E) Advanced Animal Science: (3)(F), (4)(B), (4)(E), (6)(C), (13)(A), (13)(D), (14)(A)-(D) Advanced Plant and Soil Science: (3)(F), (4)(B), (4)(E), (7)(D), (8)(A), (10)(E), (18)(D) Medical Microbiology: (3)(F), (3)(H), (4)(B), (4)(E), (7)(C) Pathophysiology: (3)(F), (3)(H), (4)(B), (4)(E), (6)(B), (8)(B)-(D) Engineering Design and Problem Solving: (3)(F), (3)(H), (4)(B), (4)(E), (6)(A) Engineering Science: (3)(F), (3)(H), (4)(B), (4)(E), (10)(A) Scientific Research and Design: (3)(F), (3)(H), (4)(B), (4)(E), (7)(A), (10)(B) Principles of Technology: (2)(K), (3)(F), (3)(H), (3)(J)-(L), (4)(B), (4)(E), (5)(H)-(J), (8)(A)-(C), (8)(H), (10)(A), (10)(C), (11)(A) Biotechnology I: (3)(F), (3)(H), (4)(B), (4)(F) Biotechnology II: (3)(F), (3)(H), (4)(B), (4)(E) Forensic Science: (3)(F), (3)(H), (4)(B), (4)(E), (6)(C)-(D), (6)(H), (16)(C) Food Science: (3)(F), (3)(H), (4)(B), (4)(E)
I.E.2. Use essential vocabulary of the discipline being studied.	Kindergarten-Grade 5: (b)(1)-(10) Grade 6: (b)(1)-(12) Grade 7: (b)(1)-(14) Grade 8: (b)(1)-(11) Aquatic Science: (c)(1)-(12) Astronomy: (c)(1)-(14) Biology: (c)(1)-(12) Chemistry: (c)(1)-(12) Earth and Space Science: (c)(1)-(15) Environmental Systems: (c)(1)-(9) IPC: (c)(1)-(7) Physics: (c)(1)-(8)		Anatomy and Physiology: (c)(1)-(13) Advanced Animal Science: (c)(1)-(15) Advanced Plant and Soil Science: (c)(1)-(20) Medical Microbiology: (c)(1)-(7) Pathophysiology: (c)(1)-(8) Engineering Design and Problem Solving: (c)(1)-(9) Engineering Science: (c)(1)-(16) Scientific Research and Design: (c)(1)-(10) Principles of Technology: (c)(1)-(12) Biotechnology I: (c)(1)-(13) Biotechnology II: (c)(1)-(14) Forensic Science: (c)(1)-(17) Food Science: (c)(1)-(21)

II. Foundation Skills: Scientific Applications of Mathematics			
A. Basic mathematics conventions			
II.A.1. Understand the real number system and its properties.	Kindergarten-Grade 2: (2)(D), (4)(B) Grades 3-4: (2)(B) Grade 5: (3)(C) Grade 6: (6)(B), (8)(C) Grade 8: (6)(A) Aquatic Science: (5)(B) Astronomy: (2)(F), (6)(A) Chemistry: (8)(A), (9)(A) Earth and Space Science: (2)(H) Environmental Systems: (7)(B) IPC: (4)(A)-(B), (7)(C) Physics: (2)(H), (6)(D)		Engineering Design and Problem Solving: (5)(B)-(D), (5)(I), (5)(K) Engineering Science: (7)(D)-(E), (7)(G), (8)(B)-(C), (9)(G), (10)(A)-(D), (10)(G)-(J), (11)(B), (14)(E)-(F), (15)(E)-(H), (16)(A)-(C) Principles of Technology: (7)(A)(i)-(ii), (9)(D) Biotechnology II: (8)(E) Forensic Science: (9)(A)
II.A.2. Use exponents and scientific notation.	Grade 8: (8)(D) Aquatics: (2)(F), (6)(A) Astronomy: (6)(B)-(C), (6)(E) Chemistry: (2)(G), (6)(C) Earth and Space Science: (2)(H) Environmental Systems: (2)(J), (7)(B) Physics: (2)(H)		Engineering Design and Problem Solving: (5)(B)-(D), (5)(I), (5)(K) Principles of Technology: (5)(F) Biotechnology I: (11)(C) Forensic Science: (9)(A)
II.A.3. Understand ratios, proportions, percentages, and decimal fractions, and translate from any form to any other.	Astronomy: (2)(F), (6)(D) Chemistry: (8)(B)-(C), (9)(A), (10)(C) Earth and Space Science: (2)(H) Environmental Systems: (4)(E), (9)(C) Physics: (5)(B)-(C), (6)(A), (6)(C)		Engineering Design and Problem Solving: (5)(B)-(D), (5)(I), (5)(K) Principles of Technology: (8)(B)-(C) Biotechnology I: (11)(C) Biotechnology II: (8)(B), (8)(D), (14)(C), (14)(E) Forensic Science: (9)(A) Introduction to Culinary Arts: (2)(C); Culinary Arts: (2)(C)(F)(G)
II.A.4. Use proportional reasoning to solve problems.	Biology: (10)(C) Chemistry: (8)(B), (10)(D) Earth and Space Science: (2)(H) Physics: (3)(F), (6)(C)		Engineering Design and Problem Solving: (5)(B)-(D), (5)(I), (5)(K) Biotechnology I: (11)(C) Biotechnology II: (4)(G) Forensic Science: (9)(A)
II.A.5. Simplify algebraic expressions.	Biology: (10)(C) Chemistry: (8)(C) Earth and Space Science: (2)(H) Physics: (2)(L), (4)(A), (5)(B)-(C), (6)(A), (6)(C)		Engineering Design and Problem Solving: (5)(B)-(D), (5)(I), (5)(K) Principles of Technology: (7)(A)(i)-(ii), (8)(B)-(C)
II.A.6. Estimate results to evaluate whether a calculated result is reasonable.	Kindergarten-Grade 5: (4)(A) Grade 6: (6)(B), (8)(C) Grade 8: (6)(A) Aquatics: (2)(F), (9)(C) Biology: (3)(A) Chemistry: (2)(I), (9)(A)(B) Earth and Space Science: (2)(H)		Anatomy and Physiology: (4)(A) Advanced Animal Science: (4)(A) Advanced Plant and Soil Science: (4)(A) Medical Microbiology: (4)(A) Pathophysiology: (4)(A) Engineering Design and Problem Solving: (4)(A), (5)(B)-(E), (5)(I), (5)(K) Engineering Science: (4)(A), (7)(D)-(E), (7)(G), (8)(B)-(C), (9)(G), (10)(A)-(D), (10)(G)-(J), (11)(B), (12)(D)-(E), (14)(E)-(F), (15)(E)-(H), (16)(A)-(C) Scientific Research and Design: (4)(A) Forensic Science: (4)(A) Culinary Arts: (2)(C)
II.A.7. Use calculators, spreadsheets, computers, etc., in data analysis.	Kindergarten-Grade 5: (4)(A) Grade 6: (6)(B), (8)(C) Grade 8: (6)(A) Chemistry: (2)(E) Physics: (4)(A)		Advanced Plant and Soil Science: (7)(B) Engineering Design and Problem Solving: (5)(B)-(D), (5)(I), (5)(K) Engineering Science: (7)(D)-(E), (7)(G), (8)(B)-(C), (9)(G), (10)(A)-(D), (10)(G)-(J), (11)(B), (12)(A), (14)(E)-(F), (15)(E)-(H), (16)(A)-(C) Principles of Technology: (7)(B), (9)(B)-(C) Culinary Arts: (10)(F);
B. Mathematics as a symbolic language			
II.B.1. Carry out formal operations using standard algebraic symbols and formulae.	Grade 6: (6)(B), (8)(C) Grade 8: (6)(A) Chemistry: (11)(D) Earth and Space Science: (2)(H), (7)(B) Environmental Systems: (7)(B) IPC: (4)(A)-(E)		Anatomy and Physiology: (3)(G) Advanced Animal Science: (3)(G) Advanced Plant and Soil Science: (3)(G), (7)(C), (18)(D) Medical Microbiology: (3)(G) Pathophysiology: (3)(G) Engineering Design and Problem Solving: (3)(G), (5)(B)-(D) Engineering Science: (3)(G), (7)(D)-(E), (7)(G), (8)(B)-(C), (9)(G), (10)(A)-(D), (10)(G)-(J), (11)(B), (12)(A), (14)(E)-(F), (15)(E)-(H), (16)(A)-(C) Scientific Research and Design: (3)(G) Principles of Technology: (3)(G), (7)(A)(i)-(ii), (7)(B), (9)(B)-(C) Forensic Science: (3)(D), (3)(G)

II.B.2. Represent natural events, processes, and relationships with algebraic expressions and algorithms.	Chemistry: (10)(C), (11)(D) Earth and Space Science: (2)(H), (7)(B) Environmental Systems: (7)(B) IPC: (4)(A)-(E), (5)(A)-(B) Physics: (5)(B)-(C)		Anatomy and Physiology: (3)(G) Advanced Animal Science: (3)(G) Advanced Plant and Soil Science: (3)(G) Medical Microbiology: (3)(G) Pathophysiology: (3)(G) Engineering Design and Problem Solving: (3)(G), (5)(B)-(D) Engineering Science: (3)(G), (7)(D)-(E), (7)(G), (8)(B)-(C), (9)(G), (10)(A)-(D), (10)(G)-(J), (11)(B), (12)(A), (14)(E)-(F), (15)(E)-(H), (16)(A)-(C) Scientific Research and Design: (3)(G) Principles of Technology: (3)(G), (7)(A)(i)-(ii), (8)(B)-(C) Forensic Science: (3)(G)
C. Understand relationships among geometry, algebra, and trigonometry			
II.C.1. Understand simple vectors, vector notations, and vector diagrams, and carry out simple calculations involving vectors.	Chemistry: (4)(E) IPC: (4)(A)-(B) Physics: (3)(F), (5)(E)		Engineering Design and Problem Solving: (5)(B)-(D), (6)(A) Engineering Science: (10)(E)-(G) Principles of Technology: (7)(A)(iii), (8)(F)
II.C.2. Understand that a curve drawn on a defined set of axes is fully equivalent to a set of algebraic equations.	Astronomy: (6)(A) Chemistry: (9)(A) Earth and Space Science: (10)(D) IPC: (4)(B) Physics: (4)(A)		Engineering Design and Problem Solving: (5)(B)-(D) Engineering Science: (10)(E)-(G), (12)(D)-(E) Biotechnology II: (4)(G)
II.C.3.Understand basic trigonometric principles, including definitions of terms such as sine, cosine, tangent, cotangent, and their relationship to triangles.			Engineering Design and Problem Solving: (5)(B)-(D) Engineering Mathematics: (5)(A)-(B)
II.C.4. Understand basic geometric principles.	Chemistry: (7)(E)		Engineering Design and Problem Solving: (5)(B)-(D) Engineering Science: (16)(D)
D. Scientific problem solving			
II.D.1. Use dimensional analysis in problem solving.	Aquatics: (2)(I) Chemistry: (2)(G), (8)(E) Environmental Systems: (2)(J)		Advanced Animal Science: (5)(B) Advanced Plant and Soil Science: (5)(B), (7)(B) Engineering Design and Problem Solving: (5)(B)-(D), (5)(I), (5)(K) Forensic Science: (8)(A), (8)(G)
E. Scientific application of probability and statistics			
II.E.1. Understand descriptive statistics.	Grades 3-5: (2)(E) Grades 6-8: (2)(E) Aquatics: (2)(F) Chemistry: (12)(B) Earth and Space Science: (2)(H)		Anatomy and Physiology: (3)(G) Advanced Animal Science: (3)(G) Advanced Plant and Soil Science: (3)(G), (7)(C), (18)(D) Medical Microbiology: (3)(G) Pathophysiology: (3)(G) Engineering Design and Problem Solving: (3)(G), (5)(B)-(D) Engineering Science: (3)(G), (15)(A)-(B), (15)(E)-(H) Scientific Research and Design: (3)(G), (8)(D)-(E), (8)(G) Principles of Technology: (3)(G) Biotechnology II: (8)(G), (13)(B) Forensic Science: (3)(G)
F. Scientific measurement			
II.F.1. Select and use appropriate Standard International (SI) units and prefixes to express measurements for real world problems.	Grades 6-8: (2)(C) Aquatics: (9)(C) Chemistry: (10)(C) Earth and Space Science: (2)(H) Physics: (2)(H)		Anatomy and Physiology: (3)(F) Advanced Animal Science: (3)(F) Advanced Plant and Soil Science: (3)(F) Medical Microbiology: (3)(F) Pathophysiology: (3)(F) Engineering Design and Problem Solving: (3)(F), (5)(B)-(D), (5)(I), (5)(J)-(K) Engineering Science: (3)(F), (11)(B), (12)(B) Scientific Research and Design: (3)(F) Principles of Technology: (3)(F), (5)(F) Biotechnology II: (8)(B), (11)(B) Forensic Science: (3)(F), (8)(C)
II.F.2. Use appropriate significant digits.	Aquatics: (2)(I) Chemistry: (2)(G) Earth and Space Science: (2)(H) Environmental Systems: (2)(J)		Anatomy and Physiology: (3)(F) Advanced Animal Science: (3)(F) Advanced Plant and Soil Science: (3)(F) Medical Microbiology: (3)(F) Pathophysiology: (3)(F) Engineering Design and Problem Solving: (3)(F), (5)(I) Engineering Science: (3)(F) Scientific Research and Design: (3)(F) Principles of Technology: (3)(F) Forensic Science: (3)(F)
II.F.3. Understand and use logarithmic notation (base 10).	Chemistry: (10)(L), (10)(I)		

III. Foundation Skills: Scientific Applications of Communication			
A. Scientific writing			
III.A.1. Use correct applications of writing practices in scientific communication.	Biology: (2)(H) Chemistry: (2)(I) IPC: (2)(E) Physics: (2)(K)		Anatomy and Physiology: (3)(H), (4)(B) Advanced Animal Science: (3)(H), (4)(B), (13)(D) Advanced Plant and Soil Science: (3)(H), (4)(B), (7)(D) Medical Microbiology: (3)(H), (4)(B), (6)(G), (6)(I) Pathophysiology: (3)(H), (4)(B) Engineering Design and Problem Solving: (3)(H), (4)(B), (6)(C)-(D) Engineering Science: (3)(H), (4)(B), (5)(D) Scientific Research and Design: (3)(H), (4)(B), (7)(A) Principles of Technology: (3)(H), (4)(B) Biotechnology I: (10)(F) Biotechnology II: (8)(F) Forensic Science: (3)(H), (4)(B)
B. Scientific reading			
III.B.1. Read technical and scientific articles to gain understanding of interpretations, apparatuses, techniques or procedures, and data.	Grades 3-5: (3)(A) Aquatics: (3)(A), (3)(C) Astronomy: (3)(A), (3)(C) Biology: (3)(A), (3)(C), (3)(F) Chemistry: (3)(A), (3)(C), (3)(F) Earth and Space Science: (3)(A), (3)(C) Environmental Systems: (3)(A), (3)(C) IPC: (3)(A), (3)(C), (3)(F) Physics: (3)(A), (3)(C), (3)(E)		Anatomy and Physiology: (4)(A)-(C) Advanced Animal Science: (4)(A)-(C) Advanced Plant and Soil Science: (4)(A)-(C) Medical Microbiology: (4)(A)-(C) Pathophysiology: (4)(A)-(C) Engineering Design and Problem Solving: (4)(A)-(C), (6)(B) Engineering Science: (4)(A)-(C) Scientific Research and Design: (4)(A)-(C), (5)(A), (6)(A)-(C) Principles of Technology: (4)(A)-(C), (12)(A)-(C) Biotechnology II: (6)(A)-(B) Forensic Science: (4)(A) - (C), (5)(E), (11)(D)
III.B.2. Set up apparatuses, carry out procedures, and collect specified data from a given set of appropriate instructions.	Kindergarten-Grade 2: (2)(D) Aquatics: (2)(A), (2)(C) Astronomy: (2)(E) Biology: (2)(F) Chemistry: (2)(E) Earth and Space Science: (2)(E) Environmental: (2)(G)-(H) Physics: (2)(F)		Anatomy and Physiology: (3)(E)-(F) Advanced Animal Science: (3)(E)-(F) Advanced Plant and Soil Science: (3)(E)-(F), (7)(A) Medical Microbiology: (3)(E)-(F), (6)(G), (6)(I) Pathophysiology: (3)(E)-(F) Engineering Design and Problem Solving: (3)(E)-(F) Engineering Science: (3)(E)-(F) Scientific Research and Design: (3)(E)-(F) Principles of Technology: (3)(E)-(F) Biotechnology I: (6)(E), (8)(D)-(E), (9)(A)-(E), (11)(B), (12)(A)-(I), (13)(A)-(B) Biotechnology II: (11)(C)-(D), (12)(A)-(C), (13)(C) Forensic Science: (3)(E)-(F), (6)(D)-(F) Food Science: (11)(D), (15)(F)
III.B.3. Recognize scientific and technical vocabulary in the field of study and use this vocabulary to enhance clarity of communication.	Kindergarten-Grade 1: (7)(B) Kindergarten-Grade 2: (7)(A) Kindergarten-Grade 5: (3)(A) Grade 2: (8)(D) Grade 3: (5)(B), (9)(A)-(C) Grades 3-5: (8)(B), (9)(B) Grade 5: (10)(B) Grade 6: (8)(B), (10)(D), (11)(A), (11)(C), (12)(E) Grade 7: (5)(B), (8)(A), (10)(A)-(C), (11)(B), (12)(A), (13)(B) Grade 8: (5)(A), (5)(C), (6)(C), (8)(A), (8)(D)-(E), (9)(A), (11)(A), (11)(D) Aquatics: (2)(J), (8)(C), (10)(B) Astronomy: (2)(H), (4)(A)-(D), (8)(B), (10)(C), (12)(A), (13)(A)-(C), (14)(A) Biology: (2)(H), (4)(B)-(C), (5)(A), (5)(C), (6)(A), (6)(C), (6)(H), (10)(A)-(B), (11)(A), (11)(D), (12)(E)-(F) Chemistry: (2)(I), (5)(A)-(C), (7)(D), (9)(A), (9)(C), (10)(A), (12)(A)-(B) Earth and Space Science: (2)(I), (4)(B), (5)(F), (8)(B), (9)(C)-(D), (10)(B)-(C), (11)(B), (12)(B), (14)(C), (15)(A), (15)(D) Environmental Systems: (2)(K) IPC: (2)(H) Physics: (2)(K), (4)(B)-(C), (4)(F), (5)(A)-(C), (5)(G)-(H), (6)(E), (6)(G), (7)(A), (7)(E)-(F), (8)(A)-(C)		Anatomy and Physiology: (1)(A), (3)(H), (4)(A)-(B), (6)(B) Advanced Animal Science: (1)(C), (3)(H), (4)(A)-(B), (6)(A)-(C), (8)(A)-(B), (8)(E)-(F), (9)(A)-(D), (11)(G), (12)(A)-(C), (13)(A), (13)(D), (14)(A)-(D) Advanced Plant and Soil Science: (1)(C), (3)(H), (4)(A)-(B), (5)(C), (7)(D), (8)(A), (14)(A), (17)(A)-(B), (18)(A), (18)(D), (19)(A)-(B), (20)(C) Medical Microbiology: (1)(A), (3)(H), (4)(A)-(B), (6)(B), (6)(G)-(J) Pathophysiology: (1)(A), (3)(H), (4)(A)-(B) Engineering Design and Problem Solving: (3)(H), (4)(A)-(B), (5)(H), (6)(B), (7)(D)-(E), (9)(I) Engineering Science: (3)(H), (4)(A)-(B), (5)(D), (6)(D), (7)(B), (9)(C)-(D) Scientific Research and Design: (3)(H), (4)(A)-(B), (5)(A), (6)(A)-(C), (9)(B) Principles of Technology: (2)(K), (3)(H), (4)(A)-(B), (7)(C), (8)(A)-(C), (8)(H)-(I), (10)(A), (10)(C), (11)(A), (11)(F)-(G) Biotechnology I: (7)(A) Biotechnology II: (7)(B), (8)(A) Forensic Science: (1), (3)(H), (4)(A)-(B), (6)(D)-(G), (11)(D) Culinary Arts:(2)(D)
III.B.4. List, use, and give examples of specific strategies before, during, and after reading to improve comprehension.			Medical Microbiology: (6)(G), (6)(I) Scientific Research and Design: (6)(A)-(C) Forensic Science: (14)(E)

C. Presentation of scientific/technical information			
III.C.1. Prepare and present scientific/technical information in appropriate formats for various audiences.	Kindergarten-Grade 2: (2)(E) Grades 3-5: (2)(F) Grades 6-8: (2)(E) Aquatic Science: (3)(B) Astronomy: (2)(H), (3)(B) Biology: (2)(H), (3)(B) Chemistry: (2)(I)-(J), (3)(B) Earth and Space Science: (2)(I), (3)(B) Environmental Systems: (2)(K), (3)(B) IPC: (2)(H), (3)(B) Physics: (2)(K), (3)(B)		Anatomy and Physiology: (3)(E), (3)(H), (4)(B), (6)(B) Advanced Animal Science: (3)(E), (3)(H), (4)(B), (13)(D) Advanced Plant and Soil Science: (3)(E), (3)(H), (4)(B), (7)(A), (7)(D) Medical Microbiology: (3)(E), (3)(H), (4)(B), (6)(G), (6)(I) Pathophysiology: (3)(E), (3)(H), (4)(B) Engineering Design and Problem Solving: (1)(C), (3)(E), (3)(H), (4)(B), (6)(C)-(D), (8)(I) Engineering Science: (1)(C), (3)(E), (3)(H), (4)(B), (5)(D) Scientific Research and Design: (1)(C), (3)(E), (3)(H), (4)(B), (7)(A), (8)(B)-(C), (8)(F), (9)(B) Principles of Technology: (1)(C), (3)(E), (3)(H), (3)(K)-(L), (4)(B), (5)(I)-(J) Biotechnology I: (10)(F) Biotechnology II: (10)(A) Forensic Science: (3)(E), (3)(H), (4)(B), (5)(D), (11)(D)
D. Research skills/information literacy			
III.D.1. Use search engines, databases, and other digital electronic tools effectively to locate information.	Kindergarten-5: (4)(A) Grade 6: (7)(A) Grade 8: (8)(E) Aquatic Science: (2)(J) Astronomy: (13)(A)-(C) Biology: (2)(F) Chemistry: (2)(E) Earth and Space Science: (2)(F) Environmental Systems: (2)(K) IPC: (2)(B) Physics: (2)(F)		Anatomy and Physiology: (4)(F), (6)(B) Advanced Animal Science: (1)(F) Advanced Plant and Soil Science: (14)(A) Medical Microbiology: (5)(B) Engineering Design and Problem Solving: (7)(A), (7)(C) Engineering Science: (6)(E) Scientific Research and Design: (4)(F), (5)(A) Principles of Technology: (4)(F) Biotechnology I: (5)(A), (5)(C)-(D), (6)(A), (10)(G) Biotechnology II: (5)(A) Forensic Science: (4)(A), (4)(E) Introduction to Culinary Arts: (5)(C)
III.D.2. Evaluate quality, accuracy, completeness, reliability, and currency of information from any source.	Grades 3-8: (3)(A) Aquatic Science: (3)(A) Astronomy: (3)(A) Biology: (3)(A) Chemistry: (3)(A) Earth and Space Science: (3)(A) Environmental Systems: (3)(A) IPC: (3)(A) Physics: (3)(A)		Anatomy and Physiology: (3)(H), (4)(A-(B), (4)(E) Advanced Animal Science: (3)(H), (4)(A)-(B), (4)(E), (13)(D) Advanced Plant and Soil Science: (3)(H), (4)(A-(B), (4)(E), (7)(D) Medical Microbiology: (3)(H), (4)(A)-(B), (4)(E) Pathophysiology: (3)(H), (4)(A)-(B), (4)(E) Engineering Design and Problem Solving: (3)(H), (4)(A)-(B), (4)(E), (6)(E), (7)(A), (7)(C), (8)(D), (8)(I) Engineering Science: (3)(H), (4)(A)-(B), (4)(E), (6)(E) Scientific Research and Design: (3)(H), (4)(A)-(B), (4)(E), (5)(A), (6)(C), (9)(C) Principles of Technology: (3)(H), (4)(A)-(B), (4)(E) Biotechnology I: (5)(A), (5)(C)-(D), (6)(A) Forensic Science: (3)(H), (4)(B), (11)(D)
IV. Science, Technology, and Society			
A. Interactions between innovations and science			
IV.A.1. Recognize how scientific discoveries are connected to technological innovations.	Grades 3-5: (3)(D) Grade 6: (11)(C) Aquatic Science: (3)(D) Astronomy: (3)(D), (4)(A), (14)(A)-(E) Biology: (3)(D) Chemistry: (3)(D) Earth and Space Science: (3)(D) Environmental Systems: (3)(D) IPC: (3)(D) Physics: (3)(D)	U.S. History Studies: (27)(A)-(B) World History Studies: (8)(A)	Anatomy and Physiology: (4)(D), (4)(F), (8)(C), (11)(C), (13)(A)-(B) Advanced Animal Science: (4)(D), (4)(F), (6)(B)-(C) Advanced Plant and Soil Science: (4)(D), (4)(F), (10)(E), (18)(D) Medical Microbiology: (4)(D), (4)(F), (5)(A), (6)(G), (6)(I), (7)(G) Pathophysiology: (4)(D), (4)(F), (7)(B) Engineering Design and Problem Solving: (4)(D), (4)(F), (7)(D)-(E) Engineering Science: (4)(D), (4)(F) Scientific Research and Design: (4)(D), (4)(F) Principles of Technology: (4)(D), (4)(F) Forensic Science: (4)(D), (4)(F)
B. Social ethics			
IV.B.1. Understand how scientific research and technology have an impact on ethical and legal practices.	Kindergarten-Grade 2: (1)(C) Grades 3-5: (1)(B) Aquatic Science: (3)(D) Astronomy: (3)(D) Biology: (1)(B), (3)(D) Chemistry: (1)(C), (3)(D) Earth and Space Science: (3)(D) Environmental Systems: (3)(D), (9)(I) IPC: (3)(D) Physics: (3)(D)		Anatomy and Physiology: (4)(D), (4)(F) Advanced Animal Science: (4)(D), (4)(F), (6)(B)-(C), (7)(D) Advanced Plant and Soil Science: (4)(D), (4)(F), (10)(E) Medical Microbiology: (4)(D), (4)(F), (5)(A), (7)(E), (7)(G) Pathophysiology: (4)(D), (4)(F), (7)(B) Engineering Design and Problem Solving: (4)(D), (4)(F), (7)(B), (8)(D) Engineering Science: (4)(D), (4)(F) Scientific Research and Design: (4)(D), (4)(F) Principles of Technology: (4)(D), (4)(F) Forensic Science: (4)(D), (4)(F)
IV.B.2. Understand how commonly held ethical beliefs impact scientific research.	Aquatic Science: (1)(B) Environmental Systems: (9)(G)		Anatomy and Physiology: (4)(D), (4)(F) Advanced Animal Science: (4)(D), (4)(F), (6)(B)-(C), (7)(D) Advanced Plant and Soil Science: (4)(D), (4)(F), (10)(E) Medical Microbiology: (4)(D), (4)(F), (7)(E), (7)(G) Pathophysiology: (4)(D), (4)(F) Engineering Design and Problem Solving: (4)(D), (4)(F), (7)(B), (8)(D) Engineering Science: (4)(D), (4)(F) Scientific Research and Design: (4)(D), (4)(F) Principles of Technology: (4)(D), (4)(F) Forensic Science: (4)(D), (4)(F)

C. History of science			
IV.C.1. Understand the historical development of major theories in science.	Grade 8: (8)(E), (9)(A) Aquatic Science: (3)(F) Astronomy: (4)(A), (4)(C) Biology: (3)(F) Chemistry: (3)(F), (6)(A) Earth and Space Science: (3)(F) Environmental Systems: (3)(F) IPC: (3)(F) Physics: (3)(D)	World History Studies: (27)(A)	Anatomy and Physiology: (3)(C)-(D), (4)(D), (4)(F) Advanced Animal Science: (3)(C)-(D), (4)(D), (4)(F) Advanced Plant and Soil Science: (3)(C)-(D), (4)(D), (4)(F), (18)(C) Medical Microbiology: (3)(C)-(D), (4)(D), (4)(F) Pathophysiology: (3)(C)-(D), (4)(D), (4)(F) Engineering Design and Problem Solving: (3)(C)-(D), (4)(D), (4)(F), (7)(D)-(E) Engineering Science: (3)(C)-(D), (4)(D), (4)(F) Scientific Research and Design: (3)(C)-(D), (4)(D), (4)(F) Principles of Technology: (3)(C)-(D), (4)(D), (4)(F) Forensic Science: (3)(C)-(D), (4)(D), (4)(F), (5)(F)
IV.C.2. Recognize the role of people in important contributions to scientific knowledge.	Kindergarten-Grade 2: (3)(C) Grades 3-8: (3)(D) Aquatic Science: (3)(E)-(F) Astronomy: (3)(E)-(F), (4)(A)-(B), (4)(D) Biology: (3)(F) Chemistry: (3)(E)-(F) Earth and Space Science: (3)(E)-(F) Environmental Systems: (3)(E)-(F) IPC: (3)(E)-(F) Physics: (3)(D)-(E)	World History Studies: (27)(E), (28)(E)	Anatomy and Physiology: (4)(D), (4)(F) Advanced Animal Science: (4)(D), (4)(F) Advanced Plant and Soil Science: (4)(D), (4)(F) Medical Microbiology: (4)(D), (4)(F), (5)(A) Pathophysiology: (4)(D), (4)(F) Engineering Design and Problem Solving: (4)(D), (4)(F), (7)(C)-(E), (9)(C) Engineering Science: (4)(D), (4)(F), (5)(B), (6)(A) Scientific Research and Design: (4)(D), (4)(F) Principles of Technology: (4)(D), (4)(F) Forensic Science: (4)(D), (4)(F)
V. Cross-Disciplinary Themes			
A. Matter/states of matter			
V.A.1. Know modern theories of atomic structure.	Grade 8: (5)(A) Aquatic Science: (6)(A)		
V.A.2. Understand the typical states of matter (solid, liquid, gas) and phase changes among these.	Kindergarten-Grade 5: (5)(B) Chemistry: (10)(A)		
B. Energy (thermodynamics, kinetic, potential, energy transfers)			
V.B.1. Understand the Laws of Thermodynamics.	Chemistry: (11)(B)-(D) Environmental Systems: (6)(D) Physics: (6)(E)-(G)		Principles of Technology: (10)(A)-(C)
V.B.2. Know the processes of energy transfer.	Grade 6: (9)(A)-(C) Grade 7: (5)(A), (5)(C), (7)(B) Biology: (12)(C) Chemistry: (11)(B)-(D) Environmental Systems: (6)(C), (6)(E) IPC: (5)(A)-(C), (5)(H), (7)(D) Physics: (6)(A)-(B), (6)(D), (6)(F)-(G)		Principles of Technology: (9)(A), (9)(D), (10)(B), (10)(C)
C. Change over time/equilibrium			
V.C.1. Recognize patterns of change.	Kindergarten-Grade 3: (6)(D) Grade 7: (13)(B) Grade 8: (7)(A)-(C), (10)(A)-(C) Aquatic Science: (6)(B) Astronomy: (5)(A)-(C) Biology: (4)(B), (11)(A) Earth and Space Science: (7)(B), (10)(D)-(E) Environmental Systems: (4)(C)-(D), (8)(D)		Anatomy and Physiology: (11)(D), (12)(A), (12)(C) Advanced Animal Science: (1)(B) Advanced Plant and Soil Science: (1)(B), (15)(E) Pathophysiology: (5)(B), (6)(D)-(E)
D. Classification			
V.D.1. Understand that scientists categorize things according to similarities and differences.	Kindergarten-Grade 6: (5)(A) Grade 6: (5)(C), (6)(A), (6)(C) Grade 7: (11)(A) Grade 8: (5)(C), (8)(A)-(B) Aquatic Science: (10)(A) Astronomy: (11)(G) Biology: (4)(A), (8)(A)-(C), (10)(C) Chemistry: (4)(D), (5)(A)-(C), (11)(C) Environmental Systems: (4)(A)-(B) IPC: (6)(D), (7)(D) Physics: (5)(E), (7)(B)-(C)		Advanced Plant and Soil Science: (6)(A)-(B), (8)(A)-(D), (9)(D)-(E), (10)(D)-(E), (12)(B), (15)(A)-(B), (16)(A) Medical Microbiology: (6)(F), (7)(C) Pathophysiology: (7)(F) Engineering Science: (5)(A), (5)(C), (8)(A) Principles of Technology: (8)(F), (11)(B), (11)(D) Biotechnology I: (5)(B)-(C) Forensic Science: (13)(A), (16)(D)-(E), (17)(A), (17)(C)
E. Measurements and models			
V.E.1. Use models to make predictions.	Grade 8: (7)(B), (9)(C) Aquatic Science: (2)(H) Earth and Space Science: (15)(B) Environmental Systems: (2)(I)		Anatomy and Physiology: (3)(G), (4)(E) Advanced Animal Science: (3)(G), (4)(E) Advanced Plant and Soil Science: (3)(G), (4)(E), (7)(C), (12)(A) Medical Microbiology: (3)(G), (4)(E) Pathophysiology: (3)(G), (4)(E) Engineering Design and Problem Solving: (3)(G), (4)(E), (5)(C), (5)(E) Engineering Science: (3)(G), (4)(E) Scientific Research and Design: (3)(G), (4)(E) Principles of Technology: (3)(G), (4)(E) Forensic Science: (3)(E), (4)(E), (16)(D)

V.E.2. Use scale to relate models and structures.	Grades 3-8: (3)(C) Grade 6: (3)(B), (10)(A) Grades 7-8: (3)(B) Astronomy: (6)(A) Biology: (3)(E)		Anatomy and Physiology: (4)(E) Advanced Animal Science: (4)(E) Advanced Plant and Soil Science: (4)(E) Medical Microbiology: (4)(E) Pathophysiology: (4)(E) Engineering Design and Problem Solving: (4)(E), (5)(C) Engineering Science: (4)(E) Scientific Research and Design: (4)(E) Principles of Technology: (4)(E) Forensic Science: (4)(E)
V.E.3. Demonstrate familiarity with length scales from sub-atomic particles through macroscopic objects.	Grades 1-2: (4)(B) Grade 8: (8)(D) Astronomy: (6)(A)-(C)		Engineering Design and Problem Solving: (5)(C)
VI. Biology			
A. Structure and function of cells			
VI.A.1. Know that although all cells share basic features, cells differentiate to carry out specialized functions.	Grade 7: (12)(D)-(F) Biology: (4)(A)-(B), (5)(B)-(C), (9)(D)		Anatomy and Physiology: (11)(B)-(D), (12)(A)-(C), (13)(A)-(B) Advanced Animal Science: (12)(A)-(B) Advanced Plant and Soil Science: (19)(A), (19)(C) Medical Microbiology: (6)(D), (6)(F) Engineering Design and Problem Solving: (5)(F) Biotechnology I: (6)(A)-(B)
VI.A.2. Explain how cells can be categorized into two major types: prokaryotic and eukaryotic, and describe major features that distinguish one from the other.	Grade 6: (12)(B), (12)(D) Biology: (4)(A)		Anatomy and Physiology: (11)(B), (12)(A), (13)(A)-(B) Advanced Animal Science: (12)(A)-(B) Advanced Plant and Soil Science: (19)(A), (19)(C) Engineering Design and Problem Solving: (5)(F) Biotechnology I: (6)(A)-(B)
VI.A.3. Describe the structure and function of major sub-cellular organelles.	Grade 6: (12)(B) Grade 7: (12)(D) Biology: (4)(A)-(C), (5)(B)		Anatomy and Physiology: (11)(B), (12)(A), (13)(A)-(B) Advanced Animal Science: (12)(A)-(B) Advanced Plant and Soil Science: (19)(A), (19)(C) Medical Microbiology: (6)(C), (6)(F) Engineering Design and Problem Solving: (5)(F) Biotechnology I: (6)(A)-(D)
VI.A.4. Describe the major features of mitosis and relate this process to growth and asexual reproduction.	Grade 7: (14)(B) Biology: (5)(A)		Anatomy and Physiology: (11)(B), (12)(A)-(C), (13)(A)-(B) Advanced Animal Science: (7)(A), (12)(A)-(B) Advanced Plant and Soil Science: (17)(D), (19)(A), (19)(C) Medical Microbiology: (6)(D) Engineering Design and Problem Solving: (5)(F)
VI.A.5. Understand the process of cytokinesis in plant and animal cells and how this process is related to growth.	Biology: (5)(A), (5)(D)		Anatomy and Physiology: (11)(B), (12)(A), (13)(A)-(B) Advanced Animal Science: (12)(A)-(B) Advanced Plant and Soil Science: (19)(A), (19)(C) Engineering Design and Problem Solving: (5)(F)
VI.A.6. Know the structure of membranes and how this relates to permeability.	Grade 7: (12)(D) Biology: (4)(C)		Anatomy and Physiology: (11)(B), (12)(A), (13)(A)-(B) Advanced Animal Science: (12)(A)-(B) Advanced Plant and Soil Science: (19)(A), (19)(C) Medical Microbiology: (6)(B)-(C), (6)(F) Engineering Design and Problem Solving: (5)(F) Forensic Science: (13)(A)
B. Biochemistry			
VI.B.1. Understand the major categories of biological molecules: lipids, carbohydrates, proteins, and nucleic acids.	Grade 7: (6)(C) Biology: (5)(A), (5)(C), (6)(A), (9)(A)		Anatomy and Physiology: (11)(B)-(C), (13)(A)-(B) Advanced Animal Science: (13)(C) Pathophysiology: (5)(A) Engineering Design and Problem Solving: (5)(F) Forensic Science: (5)(C), (13)(A) Food Science: (14)(B)
VI.B.2. Describe the structure and function of enzymes.	Biology: (9)(C)		Anatomy and Physiology: (11)(B), (13)(A)-(B) Advanced Animal Science: (13)(C) Engineering Design and Problem Solving: (5)(F) Biotechnology I: (8)(F), (8)(I) Food Science: (9)(A)-(D)
VI.B.3. Describe the major features and chemical events of photosynthesis.	Grade 4: (9)(A) Grade 5: (9)(B) Grade 7: (5)(A) Biology: (9)(B)		Advanced Animal Science: (13)(C) Engineering Design and Problem Solving: (5)(F) Food Science: (14)(A)
VI.B.4. Describe the major features and chemical events of cellular respiration.	Biology: (9)(B)		Anatomy and Physiology: (9)(A)-(C), (11)(B), (13)(A)-(B) Advanced Animal Science: (13)(C) Engineering Design and Problem Solving: (5)(F)
VI.B.5. Know how organisms respond to presence or absence of oxygen, including mechanisms of fermentation.	Aquatic Science: (11)(B) Biology: (9)(B)		Anatomy and Physiology: (11)(B), (11)(D), (13)(A)-(B) Advanced Animal Science: (13)(C) Medical Microbiology: (6)(C), (6)(F) Engineering Design and Problem Solving: (5)(F) Food Science: (10)(B), (11)(A)

VI.B.6. Understand coupled reaction processes and describe the role of ATP in energy coupling and transfer.	Biology: (4)(B)		Anatomy and Physiology: (5)(A), (11)(D), (13)(A)-(B) Advanced Animal Science: (13)(C) Engineering Design and Problem Solving: (5)(F)
C. Evolution and populations			
VI.C.1. Know multiple categories of evidence for evolutionary change and how this evidence is used to infer evolutionary relationships among organisms.	Grade 4: (10)(A) Grade 5: (7)(D) Grade 7: (11)(C) Biology: (7)(A)-(B), (7)(D)-(E), (7)(G) Earth and Space Science: (7)(A), (8)(A)-(B)		Anatomy and Physiology: (11)(B)-(C), (13)(A)-(B) Pathophysiology: (5)(B) Engineering Design and Problem Solving: (5)(F)
VI.C.2. Recognize variations in population sizes, including extinction, and describe mechanisms and conditions that produce these variations.	Grade 3: (9)(C) Grade 4: (10)(A) Grade 5: (7)(D), (9)(A) Grade 7: (11)(C) Aquatic Science: (11)(B) Biology: (7)(C)-(D), (12)(D) Earth and Space Science: (8)(C) Environmental Systems: (4)(G)-(H)		Anatomy and Physiology: (11)(B), (13)(A)-(B) Advanced Plant and Soil Science: (8)(A) Pathophysiology: (5)(B) Engineering Design and Problem Solving: (5)(F)
D. Molecular genetics and heredity			
VI.D.1. Understand Mendel's laws of inheritance.	Grades 3-5: (10)(B) Grade 7: (14)(A)-(B) Biology: (6)(A)-(B), (6)(D)-(F)		Anatomy and Physiology: (11)(B), (13)(A)-(B) Advanced Animal Science: (7)(C), (8)(A)-(B), (8)(F) Advanced Plant and Soil Science: (18)(B) Engineering Design and Problem Solving: (5)(F) Forensic Science: (11)(C)
VI.D.2. Know modifications to Mendel's laws.	Biology: (6)(F)		Anatomy and Physiology: (11)(B), (13)(A)-(B) Advanced Animal Science: (7)(C), (8)(A)-(B), (8)(F), (9)(B) Advanced Plant and Soil Science: (18)(B) Engineering Design and Problem Solving: (5)(F) Forensic Science: (11)(C)
VI.D.3. Understand the molecular structures and functions of nucleic acids.	Biology: (5)(A), (5)(C), (6)(A), (6)(C), (6)(E)		Anatomy and Physiology: (11)(B), (13)(A)-(B) Advanced Animal Science: (7)(C), (8)(A), (8)(C)-(D) Advanced Plant and Soil Science: (18)(B) Engineering Design and Problem Solving: (5)(F) Biotechnology I: (7)(A)-(I), (8)(A)-(C), (8)(F)-(I)
VI.D.4. Understand simple principles of population genetics and describe characteristics of a Hardy-Weinberg population.	Biology: (12)(F) Environmental Systems: (4)(F), (4)(H)		Anatomy and Physiology: (11)(B), (13)(A)-(B) Advanced Animal Science: (7)(B)-(C), (8)(A)-(B), (8)(F) Advanced Plant and Soil Science: (18)(B) Engineering Design and Problem Solving: (5)(F)
VI.D.5. Describe the major features of meiosis and relate this process to Mendel's laws of inheritance.	Biology: (6)(G)		Anatomy and Physiology: (11)(B), (13)(A)-(B) Advanced Animal Science: (7)(B)-(C), (8)(A)-(B), (8)(F) Advanced Plant and Soil Science: (17)(D), (18)(B) Engineering Design and Problem Solving: (5)(F)
E. Classification and taxonomy			
VI.E.1. Know ways in which living things can be classified based on each organism's internal and external structure, development, and relatedness of DNA sequences.	Kindergarten-Grade 2: (10)(B) Kindergarten-Grade 3: (10)(A) Grade 6: (12)(D) Grade 7: (11)(A) Aquatic Science: (10)(A) Biology: (8)(A),(8)(C), (10)(C) Environmental Systems: (4)(A)		Anatomy and Physiology: (11)(B), (13)(A)-(B) Advanced Animal Science: (8)(E), (9)(A)-(D) Advanced Plant and Soil Science: (6)(A)-(B), (8)(A)-(D), (9)(D)-(E), (10)(D)-(E), (15)(A)-(B), (16)(A) Medical Microbiology: (7)(B) Engineering Design and Problem Solving: (5)(F) Forensic Science: (12)(A)-(C), (17)(A)-(D), (16)(E)-(F)
F. Systems and homeostasis			
VI.F.1. Know that organisms possess various structures and processes (feedback loops) that maintain steady internal conditions.	Grade 7: (13)(B) Aquatic Science: (4)(B) Biology: (4)(B), (11)(A)		Anatomy and Physiology: (7)(A)-(B), (11)(A)-(B), (12)(C), (13)(A)-(B) Advanced Animal Science: (9)(B), (11)(B), (11)(G), (12)(A)-(B) Advanced Plant and Soil Science: (17)(C)-(D), (19)(A), (19)(C) Medical Microbiology: (7)(D) Pathophysiology: (5)(D)-(E) Engineering Design and Problem Solving: (5)(F)
VI.F.2. Describe, compare, and contrast structures and processes that allow gas exchange, nutrient uptake and processing, waste excretion, nervous and hormonal regulation, and reproduction in plants, animals, and fungi; give examples of each.	Grade 7: (12)(A)-(B), (12)(E) Biology: (10)(A)-(B)		Anatomy and Physiology: (5)(B)-(D), (7)(A), (8)(A)-(B), (9)(A)-(C), (11)(A)-(B), (13)(A)-(B) Advanced Animal Science: (7)(A), (9)(B)-(D), (11)(B), (11)(G), (12)(A)-(B) Advanced Plant and Soil Science: (17)(C)-(D), (19)(A), (19)(C) Pathophysiology: (5)(D) Engineering Design and Problem Solving: (5)(F)
G. Ecology			
VI.G.1. Identify Earth's major biomes, giving their locations, typical climate conditions, and characteristic organisms.			Advanced Plant and Soil Science: (9)(A), (10)(B), (10)(E) Engineering Design and Problem Solving: (5)(F)

VI.G.2. Know patterns of energy flow and material cycling in Earth's ecosystems.	Kindergarten-Grade 2: (8)(C) Grade 1: (9)(C) Grades 1-2, 4-5: (8)(B) Grades 3-5: (9)(B) Grade 5: (7)(A), (9)(D) Grade 7: (5)(C) Grade 8: (11)(B) Aquatic Science: (6)(A), (11)(A) Biology: (12)(C), (12)(E) Earth and Space Science: (5)(C), (6)(A)-(B), (13)(F), (15)(D) Environmental Systems: (4)(C)-(D)		Advanced Plant and Soil Science: (9)(A), (10)(B), (10)(E) Engineering Design and Problem Solving: (5)(F)
VI.G.3. Understand typical forms of organismal behavior.	Grades 1-3: (9)(C) Grade 7: (13)(A) Grade 8: (11)(A) Aquatic Science: (5)(A), (5)(D) Biology: (11)(B), (12)(A)		Advanced Animal Science: (13)(C) Advanced Plant and Soil Science: (9)(A), (10)(B), (10)(E) Medical Microbiology: (6)(G), (6)(I) Engineering Design and Problem Solving: (5)(F)
VI.G.4. Know the process of succession.	Grade 7:(10)(C) Biology: (11)(D) Environmental Systems: (8)(C)		Advanced Plant and Soil Science: (9)(A), (10)(B), (10)(E) Engineering Design and Problem Solving: (5)(F)
VII. Chemistry			
A. Matter and its properties			
VII.A.1. Know that physical and chemical properties can be used to describe and classify matter.	Kindergarten-Grade 5: (5)(A) Grade 2: (5)(C) Grade 6: (6)(A), (6)(C) Grade 8: (5)(B) Chemistry: (4)(A)-(D) IPC: (6)(B)		Engineering Design and Problem Solving: (5)(F) Forensic Science: (10)(A), (11)(A) Food Science: (13)(A)
VII.A.2. Recognize and classify pure substances (elements, compounds) and mixtures.	Grades 3-4: (5)(D) Grade 6: (5)(C) Chemistry: (4)(D)		Engineering Design and Problem Solving: (5)(F) Food Science: (7)(A)-(B)
B. Atomic structure			
VII.B.1. Summarize the development of atomic theory. Understand that models of the atom are used to help understand the properties of elements and compounds.	Chemistry: (6)(A)-(C), (6)(E)		Engineering Design and Problem Solving: (5)(F)
C. Periodic table			
VII.C.1. Know the organization of the periodic table.	Grade 8: (5)(C)		Advanced Animal Science: (13)(C) Engineering Design and Problem Solving: (5)(F)
VII.C.2. Recognize the trends in physical and chemical properties as one moves across a period or vertically through a group.	Grade 8: (5)(C) Chemistry: (5)(A)-(C)		Advanced Animal Science: (13)(C) Engineering Design and Problem Solving: (5)(F)
D. Chemical bonding			
VII.D.1. Characterize ionic bonds, metallic bonds, and covalent bonds. Describe the properties of metals and ionic and covalent compounds.	Chemistry: (7)(A), (7)(C)-(D) IPC: (6)(D)		Engineering Design and Problem Solving: (5)(F)
E. Chemical reactions			
VII.E.1. Classify chemical reactions by type. Describe the evidence that a chemical reaction has occurred.	Grade 6: (5)(D) Grade 7: (6)(B) Grade 8: (5)(E) Chemistry: (10)(H)		Anatomy and Physiology: (7)(A) Medical Microbiology: (6)(C) Engineering Design and Problem Solving: (5)(F) Forensic Science: (8)(D), (9)(B) Food Science: (7)(C)-(D), (16)(A)
VII.E.2. Describe the properties of acids and bases, and identify the products of a neutralization reaction.	Chemistry: (10)(G)-(H), (10)(J)		Medical Microbiology: (6)(C) Engineering Design and Problem Solving: (5)(F) Forensic Science: (9)(B) Food Science: (5)(A)-(B), (11)(B)
VII.E.3. Understand oxidation-reduction reactions.	Chemistry: (10)(H)		Medical Microbiology: (6)(C) Engineering Design and Problem Solving: (5)(F) Food Science: (15)(D)
VII.E.4. Understand chemical equilibrium.			Medical Microbiology: (6)(C) Engineering Design and Problem Solving: (5)(F)
VII.E.5. Understand energy changes in chemical reactions.	Chemistry: (11)(A)-(E) IPC: (7)(D)		Medical Microbiology: (6)(C) Engineering Design and Problem Solving: (5)(F)
VII.E.6. Understand chemical kinetics.	Chemistry: (9)(C), (11)(A) Earth and Space Science: (5)(B) IPC: (5)(A)		Medical Microbiology: (6)(C) Engineering Design and Problem Solving: (5)(F)
F. Chemical nomenclature			
VII.F.1. Know formulas for ionic compounds.	Grade 8: (5)(D) Chemistry: (7)(A)-(C)		Engineering Design and Problem Solving: (5)(F) Forensic Science: (10)(A)-(B)

VII.F.2. Know formulas for molecular compounds.	Grade 8: (5)(D) Chemistry: (7)(B)-(C), (8)(C)		Engineering Design and Problem Solving: (5)(F) Forensic Science: (10)(B)
G. The mole and stoichiometry			
VII.G.1. Understand the mole concept.	Chemistry: (8)(A)-(B), (9)(A)		Engineering Design and Problem Solving: (5)(F) Biotechnology I: (11)(B), (14)(E)
VII.G.2. Understand molar relationships in reactions, stoichiometric calculations, and percent yield.	Chemistry: (8)(B)-(E), (9)(B)		Engineering Design and Problem Solving: (5)(F) Biotechnology I: (11)(B), (14)(E)
H. Thermochemistry			
VII.H.1. Understand the Law of Conservation of Energy and processes of heat transfer.	Grade 8: (10)(A) Chemistry: (11)(B) IPC: (5)(E)-(D) Physics: (6)(D), (6)(G)		Engineering Design and Problem Solving: (5)(F) Principles of Technology: (9)(D), (10)(C)
VII.H.2. Understand energy changes and chemical reactions.	Grade 6: (5)(D) Grade 8: (5)(E) Chemistry: (11)(C)-(E) IPC: (7)(A), (7)(D)		Engineering Design and Problem Solving: (5)(F) Food Science: (13)(B)-(D)
I. Properties and behavior of gases, liquids, and solids			
VII.I.1. Understand the behavior of matter in its various states: solid, liquid, and gas.	Grades 3-5: (5)(B) Chemistry: (4)(C) IPC: (5)(E), (6)(A), (6)(E)		Engineering Design and Problem Solving: (5)(F)
VII.I.2. Understand properties of solutions.	Chemistry: (10)(B), (10)(D)-(F) IPC: (6)(E)		Engineering Design and Problem Solving: (5)(F) Food Science: (8)(A)-(D), (8)(F), (17)(B), (18)(A), (18)(C)
VII.I.3. Understand principles of ideal gas behavior and kinetic molecular theory.	Chemistry: (9)(A)-(C)		Engineering Design and Problem Solving: (5)(F)
VII.I.4. Apply the concept of partial pressures in a mixture of gases.	Chemistry: (9)(A)		Engineering Design and Problem Solving: (5)(F)
VII.I.5. Know properties of liquids and solids.	Kindergarten-5: (5)(A) Chemistry: (4)(C) IPC: (6)(E)		Engineering Design and Problem Solving: (5)(F)
VII.I.6. Understand the effect of vapor pressure on changes in state; explain heating curves and phase diagrams.	Chemistry: (9)(A)-(B)		Engineering Design and Problem Solving: (5)(F)
VII.I.7. Describe intermolecular forces.	Chemistry: (7)(D) IPC: (6)(A)		Engineering Design and Problem Solving: (5)(F)
J. Basic structure and function of biological molecules: proteins, carbohydrates, lipids, and nucleic acids			
VII.J.1. Understand the major categories of biological molecules: proteins, carbohydrates, lipids, and nucleic acids.	Grade 7: (6)(C) Biology: (5)(A), (5)(C), (6)(A), (9)(A)		Engineering Design and Problem Solving: (5)(F) Forensic Science: (10)(B)-(C)
K. Nuclear chemistry			
VII.K.1. Understand radioactive decay.	Chemistry: (12)(A)-(C) Earth and Space Science: (7)(B) IPC: (7)(E)		Engineering Design and Problem Solving: (5)(F) Principles of Technology: (8)(I), (12)(D)-(F) Food Science: (19)(A)
VIII. Physics			
A. Matter			
VIII.A.1. Demonstrate familiarity with length scales from sub-atomic particles through macroscopic objects.	Grades 1-2: (4)(B) Grade 8: (8)(D) Astronomy: (6)(A)-(C)		Engineering Design and Problem Solving: (5)(F) Principles of Technology: (8)(H)
VIII.A.2. Understand states of matter and their characteristics.	Grades 2-5: (5)(A) Grades 3-4: (5)(B) Grade 3: (5)(C) Chemistry: (4)(C) IPC: (5)(E), (6)(A), (7)(A)		Engineering Design and Problem Solving: (5)(F) Principles of Technology: (8)(H)
VIII.A.3. Understand the concepts of mass and inertia.	Grade 8: (6)(C) Physics: (4)(D)		Engineering Design and Problem Solving: (5)(F) Engineering Science: (10)(B) Principles of Technology: (7)(B), (8)(H)
VIII.A.4. Understand the concept of density.	Grade 6: (6)(B) Aquatic Science: (8)(A) Earth and Space Science: (5)(E), (10)(B), (13)(B) IPC: (6)(B)		Engineering Design and Problem Solving: (5)(F) Engineering Science: (11)(B) Principles of Technology: (8)(H)
VIII.A.5. Understand the concepts of gravitational force and weight.	Grade 3: (6)(C) Grade 4: (6)(D) Grade 6:(11)(B) Astronomy: (9)(C) Earth and Space Science: (5)(A)-(B), (9)(C) IPC: (4)(F)-(G), (5)(B) Physics: (5)(A)-(B)		Engineering Design and Problem Solving: (5)(F) Principles of Technology: (8)(A)-(B), (8)(H) Forensic Science: (9)(A)

B. Vectors			
VIII.B.1. Understand how vectors are used to represent physical quantities.	Physics: (3)(F), (4)(E)		Engineering Design and Problem Solving: (5)(F) Engineering Science: (10)(E)-(F) Principles of Technology: (7)(A)(iii), (7)(C), (8)(H) Engineering Mathematics: (4)(A)
VIII.B.2. Demonstrate knowledge of vector mathematics using a graphical representation.	Physics: (3)(F), (4)(E)		Engineering Design and Problem Solving: (5)(F) Engineering Science: (10)(G)-(H) Principles of Technology: (7)(A)(ii), (8)(H) Engineering Mathematics: (4)(A)
VIII.B.3. Demonstrate knowledge of vector mathematics using a numerical representation.	Physics: (3)(F)		Engineering Design and Problem Solving: (5)(F) Engineering Science: (10)(G)-(H) Principles of Technology: (7)(A)(ii), (8)(H) Engineering Mathematics: (4)(A)
C. Forces and motion			
VIII.C.1. Understand the fundamental concepts of kinematics.	Kindergarten-Grade 5: (6)(D) Grade 3: (6)(B)-(C) Grade 6: (8)(B) Grade 8: (6)(B) IPC: (4)(A)-(D) Physics: (4)(A)-(B), (4)(F)		Anatomy and Physiology: (6)(E) Engineering Design and Problem Solving: (5)(F) Engineering Science: (7)(A)-(C) Principles of Technology: (7)(C), (8)(H) Forensic Science: (9)(A), (14)(B)
VIII.C.2. Understand forces and Newton's Laws.	Grade 6: (8)(B) Grade 8: (6)(A), (6)(C) Astronomy: (9)(C) IPC: (4)(D) Physics: (4)(D)		Engineering Design and Problem Solving: (5)(F) Engineering Science: (10)(C), (10)(I)-(J) Principles of Technology: (7)(B), (8)(H) Forensic Science: (9)(A)
VIII.C.3. Understand the concept of momentum.	IPC: (4)(E) Physics: (6)(C)-(D)		Anatomy and Physiology: (6)(E) Engineering Design and Problem Solving: (5)(F) Engineering Science: (7)(A)-(C) Principles of Technology: (8)(H), (9)(C)-(D) Forensic Science: (9)(A)
D. Mechanical energy			
VIII.D.1. Understand potential and kinetic energy.	Grade 6: (8)(A) IPC: (5)(A)-(B) Physics: (6)(B)		Engineering Design and Problem Solving: (5)(F) Engineering Science: (9)(A)-(C) Principles of Technology: (8)(H), (9)(A)-(C)
VIII.D.2. Understand conservation of energy.	Chemistry: (11)(B) IPC: (5)(D) Physics: (6)(D), (6)(G)		Engineering Design and Problem Solving: (5)(F) Engineering Science: (9)(A)-(C)
VIII.D.3. Understand the relationship of work and mechanical energy.	Grade 3: (6)(A) Grade 7: (7)(A) Physics: (6)(A)		Engineering Design and Problem Solving: (5)(F) Engineering Science: (9)(A)-(C) Principles of Technology: (8)(H), (9)(A)-(C) Engineering Mathematics: (10)(D)(E)
E. Rotating systems			
VIII.E.1. Understand rotational kinematics.			Engineering Design and Problem Solving: (5)(F) Engineering Science: (7)(A)-(C) Principles of Technology: (8)(H)
VIII.E.2. Understand the concept of torque.			Anatomy and Physiology: (6)(D) Engineering Design and Problem Solving: (5)(F) Engineering Science: (7)(A)-(C) Principles of Technology: (8)(H)
VIII.E.3. Apply the concept of static equilibrium.			Engineering Design and Problem Solving: (5)(F) Engineering Science: (7)(A)-(C), (10)(I)-(J) Principles of Technology: (8)(H)
VIII.E.4. Understand angular momentum.			Engineering Design and Problem Solving: (5)(F) Engineering Science: (7)(A)-(C) Principles of Technology: (8)(H)
F. Fluids			
VIII.F.1. Understand pressure in a fluid and its applications.	Aquatic Science: (8)(A), (8)(C)		Engineering Design and Problem Solving: (5)(F) Engineering Science: (14)(A)-(F)
VIII.F.2. Understand Pascal's Principle.	Aquatic Science: (8)(A)		Engineering Design and Problem Solving: (5)(F) Engineering Mathematics: (3)(C), (8)(A)-(C) Engineering Science: (14)(A)-(F)
VIII.F.3. Understand buoyancy.	Aquatic Science: (8)(A) IPC: (6)(C)		Engineering Design and Problem Solving: (5)(F) Engineering Science: (14)(A)-(F)
VIII.F.4. Understand Bernoulli's principle.	Aquatic Science: (8)(A)		Engineering Design and Problem Solving: (5)(F) Engineering Science: (14)(A)-(F), (15)(C) Aircraft Powerplant Technology: (3)(B)(E)

G. Oscillations and waves			
VIII.G.1. Understand basic oscillatory motion and simple harmonic motion.	Earth and Space Science: (15)(A) Physics: (7)(A)		Engineering Design and Problem Solving: (5)(F) Principles of Technology: (11)(A)
VIII.G.2. Understand the difference between transverse and longitudinal waves.	Physics: (7)(C)		Engineering Design and Problem Solving: (5)(F) Principles of Technology: (11)(D)
VIII.G.3. Understand wave terminology: wavelength, period, frequency, and amplitude.	Grade 8: (8)(C) Chemistry: (6)(B)-(C) IPC: (5)(G) Physics: (7)(B)		Engineering Design and Problem Solving: (5)(F) Principles of Technology: (11)(B)-(C)
VIII.G.4. Understand the properties and behavior of sound waves.	Physics: (7)(C)-(D), (7)(F)		Engineering Design and Problem Solving: (5)(F) Principles of Technology: (11)(C)-(E), (11)(G)
H. Thermodynamics			
VIII.H.1. Understand the gain and loss of heat energy in matter.	Grade 6: (9)(A)-(B) Grade 8: (10)(A) Environmental Systems: (6)(D) IPC: (5)(D)-(E) Physics: (6)(F)		Engineering Design and Problem Solving: (5)(F) Engineering Science: (9)(E)-(F) Principles of Technology: (10)(B) Food Science: (13)(A)-(D), (19)(B)
VIII.H.2. Understand the basic laws of thermodynamics.	Environmental Systems: (6)(D) Physics: (6)(E), (6)(G)		Engineering Design and Problem Solving: (5)(F) Engineering Science: (9)(E)-(F) Principles of Technology: (10)(A), (10)(C)
I. Electromagnetism			
VIII.I.1. Discuss electric charge and electric force.	Grades 4-5: (6)(C) IPC: (4)(G), (5)(C) Physics: (5)(C)-(D)		Engineering Design and Problem Solving: (5)(F) Principles of Technology: (8)(C)-(E), (8)(H)
VIII.I.2. Gain qualitative and quantitative understandings of voltage, current, and resistance.	Physics: (5)(F)		Engineering Design and Problem Solving: (5)(F) Engineering Science: (8)(D) Principles of Technology: (8)(G)-(H)
VIII.I.3. Understand Ohm's Law.	Physics: (5)(F)		Engineering Design and Problem Solving: (5)(F) Engineering Science: (8)(D) Principles of Technology: (8)(G)-(H)
VIII.I.4. Apply the concept of power to electricity.	Grades 4-5: (6)(C) Physics: (5)(F)		Engineering Design and Problem Solving: (5)(F) Engineering Science: (9)(D) Principles of Technology: (8)(G)-(H)
VIII.I.5. Discuss basic DC circuits that include voltage sources and combinations of resistors.	IPC: (5)(F) Physics: (5)(F)		Engineering Design and Problem Solving: (5)(F) Engineering Science: (8)(D) Principles of Technology: (8)(G)-(H)
VIII.I.6. Discuss basic DC circuits that include voltage sources and combinations of capacitors.	IPC: (5)(F) Physics: (5)(F)		Engineering Design and Problem Solving: (5)(F) Engineering Science: (8)(D) Principles of Technology: (8)(G)-(H)
VIII.I.7. Understand magnetic fields and their relationship to electricity.	Physics: (5)(G)		Engineering Design and Problem Solving: (5)(F) Principles of Technology: (8)(H)
VIII.I.8. Relate electricity and magnetism to everyday life.	Grade 5: (6)(B) IPC: (5)(C) Physics: (5)(D), (7)(F)		Engineering Design and Problem Solving: (5)(F) Principles of Technology: (8)(D)-(E), (8)(H)
J. Optics			
VIII.J.1. Know the electromagnetic spectrum.	Grade 8: (8)(C) Astronomy: (14)(D) Chemistry: (6)(B) Physics: (7)(C)		Engineering Design and Problem Solving: (5)(F) Principles of Technology: (11)(D)
VIII.J.2. Understand the wave/particle duality of light.	Physics: (8)(A)		Engineering Design and Problem Solving: (5)(F) Principles of Technology: (12)(A)
VIII.J.3. Understand concepts of geometric optics.	Physics: (8)(A)		Engineering Design and Problem Solving: (5)(F) Principles of Technology: (12)(A) Forensic Science: (7)(D)
IX. Earth and Space Sciences			
A. Earth systems			
IX.A.1. Know the major features and characteristics of atmosphere, geosphere, hydrosphere, and biosphere.	Grades 4-5: (8)(B) Grade 6: (10)(A) Aquatic Science: (6)(A), (9)(A) Biology: (12)(C), (12)(E) Earth and Space Science: (6)(A)-(D) Environmental Systems: (4)(C), (6)(H)		
IX.A.2. Understand relationships and interactions among atmosphere, geosphere, hydrosphere, and biosphere.	Grade 5: (8)(B) Grade 7: (8)(A) Aquatic Science: (6)(B) Earth and Space Science: (6)(B)-(C), (11)(C), (13)(A) Environmental Systems: (8)(D)		Advanced Plant and Soil Science: (10)(G)

IX.A.3. Possess a scientific understanding of the history of Earth's systems.	Astronomy: (4)(A) Biology: (7)(A) Earth and Space Science: (6)(A)-(D), (8)(A)-(C), (9)(A)-(C)		
IX.A.4. Utilize the tools scientists use to study and understand the Earth's systems.	Kindergarten-Grade 8: (4)(A) Grade 8: (9)(C) Aquatic Science: (4)(C), (5)(B) Biology: (2)(F) Earth and Space Science: (2)(E)-(F), (9)(C) Environmental Systems: (2)(G)-(H), (4)(E)		
B. Sun, Earth, and moon system			
IX.B.1. Understand interactions among the sun, Earth, and moon.	Kindergarten: (8)(B) Grade 1: (8)(C) Grade 2: (8)(C) Grade 3: (8)(B)-(C) Grade 4: (8)(B)-(C) Grade 5: (8)(B) Grade 6: (11)(A) Grade 8: (7)(A)-(C) Astronomy: (7)(A)-(D), (8)(A)-(D)		
IX.B.2. Possess a scientific understanding of the formation of the Earth and moon.	Earth and Space Science: (5)(D)		
C. Solar system			
IX.C.1. Describe the structure and motions of the solar system and its components.	Astronomy: (9)(B)-(C), (10)(A) Earth and Space Science: (5)(C), (5)(E)		
IX.C.2. Possess a scientific understanding of the formation of the solar system.	Astronomy: (9)(D) Earth and Space Science: (5)(A)		
D. Origin and structure of the universe			
IX.D.1. Understand scientific theories for the formation of the universe.	Grade 8: (8)(E) Astronomy: (11)(B), (13)(A)-(B) Earth and Space Science: (4)(A), (4)(C)		
IX.D.2. Know the current scientific descriptions of the components of the universe.	Grade 8: (8)(A)-(B) Astronomy: (11)(A)-(G), (12)(A)-(G) Earth and Space Science: (4)(C)		
E. Plate tectonics			
IX.E.1. Describe the evidence that supports the current theory of plate tectonics.	Grade 8: (9)(A) Earth and Space Science: (9)(A), (10)(A), (10)(D), (10)(F), (11)(B)		
IX.E.2. Identify the major tectonic plates.	Grade 6: (10)(C)		
IX.E.3. Describe the motions and interactions of tectonic plates.	Grade 6: (10)(D) Grade 8: (9)(B) Earth and Space Science: (10)(B)-(C), (10)(E) Environmental Systems: (8)(A)		
IX.E.4. Describe the rock cycle and its products.	Grade 5: (7)(A) Grade 6:(10)(B) Environmental Systems: (4)(C)		
F. Energy transfer within and among systems			
IX.F.1. Describe matter and energy transfer in the Earth's systems.	Grade 3: (9)(B) Grade 5: (9)(D) Grade 8: (10)(A) Aquatic Science: (6)(A) Earth and Space Science: (9)(A), (14)(C) Environmental Systems: (4)(C) IPC: (5)(G), (5)(I), (14)(C)		Principles of Technology: (12)(D)
IX.F.2. Give examples of effects of energy transfer within and among systems.	Grade 5: (9)(B), (9)(D) Grade 8: (10)(A)-(C) Aquatic Science: (11)(A) Biology: (9)(B), (12)(C) Earth and Space Science: (9)(A), (14)(C) Environmental Systems: (6)(C)-(E)		Engineering Science: (9)(F)-(G)
X. Environmental Science			
A. Earth systems			
X.A.1. Recognize the Earth's systems.	Aquatic Science: (4)(A) Earth and Space Science: (9)(B) Environmental Systems: (6)(A)		Advanced Plant and Soil Science: (6)(A)-(B), (10)(E)

X.A.2. Know the major features of the geosphere and the factors that modify them.	Grades 3-5: (7)(B) Grade 6: (10)(D) Grade 7: (8)(B) Grade 8: (9)(B)-(C) Aquatic Science: (4)(A) Environmental Systems: (6)(A), (8)(A)		Advanced Plant and Soil Science: (10)(E)-(F), (12)(C)
X.A.3. Know the major features of the atmosphere.	Kindergarten-Grade 5: (8)(A) Grade 8: (10)(A)-(C) Environmental Systems: (6)(A)		Advanced Plant and Soil Science: (10)(E)
X.A.4. Know the major features of the hydrosphere.	Kindergarten-Grade 2: (7)(B) Aquatic Science: (4)(A), (7)(A) Environmental Systems: (6)(A)		Advanced Plant and Soil Science: (10)(E)
X.A.5. Be familiar with Earth's major biomes.	Grade 5: (9)(A) Environmental Systems: (4)(B), (4)(D)		Advanced Plant and Soil Science: (6)(A)-(B), (10)(E)
X.A.6. Describe the Earth's major biogeochemical cycles.	Aquatic Science: (6)(A) Environmental Systems: (6)(A)		Advanced Plant and Soil Science: (10)(E)
B. Energy			
X.B.1. Understand energy transformations.	Grades 1,6: (9)(C) Grade 7: (5)(C) Grade 8: (11)(A) Biology: (12)(A), (12)(C) Environmental Systems: (6)(C), (6)(E)		Advanced Plant and Soil Science: (20)(A)-(D) Engineering Science: (9)(D), (9)(F)-(G)
X.B.2. Know the various sources of energy for humans and other biological systems.	Grades 1,4: (9)(C) Grade 7: (5)(C) Grade 8: (11)(A) Environmental Systems: (6)(C)-(D)		Advanced Plant and Soil Science: (20)(A)-(D) Engineering Science: (9)(D)
C. Populations			
X.C.1. Recognize variations in population sizes, including human population and extinction, and describe mechanisms and conditions that produce these variations.	Grade 3: (9)(C) Grade 7: (11)(B) Grade 8: (11)(C) Aquatic Science: (12)(B) Biology: (7)(D), (11)(B), (11)(D), (12)(D) Earth and Space Science: (11)(E) Environmental Systems: (4)(G), (7)(A)-(B), (7)(D), (8)(A)		Advanced Animal Science: (11)(G) Advanced Plant and Soil Science: (10(E) Pathophysiology: (8)(D)
D. Economics and politics			
X.D.1. Name and describe major environmental policies and legislation.	Aquatic Science: (12)(E) Environmental Systems: (9)(I), (9)(K), (9)(L)		Advanced Animal Science: (13)(B), (14)(C) Medical Microbiology: (5)(B), (7)(H) Engineering Design and Problem Solving: (8)(D)
X.D.2. Understand the types, uses, and regulations of the various natural resources.	Aquatic Science: (1)(B), (12)(E)-(D) Astronomy: (1)(B) Biology: (1)(B), (12)(D) Chemistry: (1)(C) Earth and Space Science: (1)(B), (3)(D), (12)(A)-(E) Environmental Systems: (1)(B), (5)(C)-(F), (7)(C), (7)(K) IPC: (1)(B) Physics: (1)(C)		Advanced Animal Science: (2)(B), (13)(B), (14)(C) Advanced Plant and Soil Science: (2)(B) Medical Microbiology: (2)(B), (7)(H) Pathophysiology: (2)(B) Engineering Design and Problem Solving: (2(B), (8)(D) Engineering Science: (2)(B) Scientific Research and Design: (2)(B) Principles of Technology: (2)(B)
E. Human practices and their impacts			
X.E.1. Describe the different uses for land (land management).	Environmental Systems: (5)(A), (9)(J)		Advanced Animal Science: (13)(B), (13)(E), (14)(B) Advanced Plant and Soil Science: (9)(C), (10)(A)-(C), (10)(E), (13)(B), (15)(B) Engineering Design and Problem Solving: (8)(D)
X.E.2. Understand the use and consequences of pest management.	Biology: (12)(F) Environmental Systems: (4)(F)-(G), (8)(B), (9)(A)-(B), (9)(J)		Advanced Animal Science: (11)(G), (13)(B) Advanced Plant and Soil Science: (8)(C), (9)(C), (10)(B), (10)(E), (13)(B) Engineering Design and Problem Solving: (8)(D)
X.E.3. Know the different methods used to increase food production.	Environmental Systems: (5)(E), (9)(G), (9)(J)		Advanced Animal Science: (6)(B)-(C), (7)(B), (8)(F), (13)(A), (13)(E), (14)(D) Advanced Plant and Soil Science: (9)(C), (10)(B), (10)(E), (13)(B) Engineering Design and Problem Solving: (8)(D)
X.E.4. Understand land and water usage and management practices.	Grade 7: (8)(C) Environmental Systems: (4)(E), (5)(A)-(B), (5)(F), (8)(C), (9)(A)-(C), (9)(J)		Advanced Plant and Soil Science: (9)(C), (10)(A)-(C), (10)(E), (13)(B), (14)(B) Engineering Design and Problem Solving: (8)(D)
X.E.5. Understand how human practices affect air, water, and soil quality.	Grade 5: (9)(C) Grades 6-8: (1)(B) Grade 7: (8)(C) Grade 8: (11)(D) Aquatic Science: (12)(A)-(D) Biology: (12)(F) Earth and Space Science: (11)(E) Environmental Systems: (4)(D)-(F), (5)(F), (8)(B), (9)(A)-(B), (9)(D)-(E), (9)(J) IPC: (5)(I), (7)(F)		Anatomy and Physiology: (2)(B) Advanced Animal Science: (2)(B) Advanced Plant and Soil Science: (2)(B), (8)(C), (9)(C), (10)(B), (10(E)-(G), (13)(B)-(C) Medical Microbiology: (2)(B) Pathophysiology: (2)(B) Engineering Design and Problem Solving: (2(B), (8)(D) Engineering Science: (2)(B) Scientific Research and Design: (2)(B) Principles of Technology: (2)(B)