Huntsville City Schools

Pacing Guide 2017 – 2018

Course: Life Science Grade: 7

First Nine Weeks

Science & Technology

From Molecules to Organisms: Structures & Processes

Ecosystem: Interactions, Energy, & Dynamics

Science, Engineering, and Technology Vocabulary	Note: These terms should be introduced to students at the beginning of the year and retaught on an ongoing basis through the year: science, scientific method, scientific inquiry, observing, Inferring, predicting, classifying, evaluating, question, hypothesis, control, controlled experiment, variable, manipulated variable, responding variable, controlled experiment, data, conclusion, model, ethics, personal bias, cultural bias, experimental bias, objective, scientific theory, scientific law, data, graph, table, chart, metric system, SI, meter, kilometer, centimeter, millimeter, volume, liter, cubic centimeter, milliliter, mass, weight, meniscus, density, gram, kilogram, milligram, controlled experiment, test tube, graduated cylinder, beaker, balance scale, stopwatch, microscope, estimate, safety symbol
Chapter 1 Vocabulary (1.1 - 1.4)	**Section 1.1:** organism, cell, unicellular, multicellular, metabolism, stimulus, response, development, asexual reproduction, sexual reproduction, spontaneous generation, controlled experiment, autotroph, heterotroph, homeostasis **Section 1.2:** classification, taxonomy, binomial nomenclature, genus, species **Section 1.3:** prokaryote, eukaryote, nucleus **Section 1.4:** evolution, branching tree diagram, shared derived characteristic, convergent evolution
Chapter 2 Vocabulary (2.1 - 2.4)	**Section 2.1:** cell, microscope, cell theory, Hooke, Leeuwenhoek, Schleiden, Schwann, Virchow **Section 2.2:** cell wall, cell membrane, nucleus, organelle, ribosome, cytoplasm, mitochondria, endoplasmic reticulum, Golgi apparatus, vacuole, chloroplast, lysosome, multicellular, unicellular, tissue, organ, organ system

	Section 2.3: element, compound, carbohydrate, lipid, protein, enzyme, nucleic acid, DNA, double helix **Section 2.4:** selectively permeable, passive transport, diffusion, osmosis, active transport, endocytosis, exocytosis
Chapter 3 Vocabulary (3.1 - 3.3)	**Section 3.1:** food chain, food web, photosynthesis, autotroph, heterotroph, chlorophyll **Section 3.2:** cellular respiration, fermentation **Section 3.3:** cell cycle, interphase, replication, chromosome, mitosis, cytokinesis

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Standard	Resources	Approximate Pacing Number of Days
Intro.- Rules / Lab Safety/ Scientific Method	**Science and Technology Module - Found at the end of the second book.** **Chapter 1 What is Science** **Chapter 3 The Tools of Science** **Appendix A Safety Symbols** **Appendix B Using a Laboratory Balance** **Performance Assessment Chapter 3 A Graph Shows A Trend** LTF: Penny Lab: Scientific Method LTF: Foundation lesson 9: Essay Writing Skill	5 days
2. Gather and synthesize information to explain how prokaryotic and eukaryotic cells differ in structure and function, including the methods of asexual and sexual reproduction.	**Chapter 1.1 What Is Life** **Chapter 1.2 Classifying Life** **Chapter 1.3 Domains and Kingdoms** **Chapter 1.4 Evolution and Classification** **A.M.S.T.I. (1st Nine Weeks)** **Studying The Development and Reproduction of Organisms**	7 days
1. Engage in argument from evidence to support claims of the cell theory.	**Chapter 2.1 Discovering Cells** LTF: Cell Factory	3 days
3. Construct an explanation of the function (e.g., mitochondria releasing energy during cellular respiration) of	**Chapter 2.2 Looking Inside Cells** LTF: Is it Plant or Animal? LTF: Microscope Mystery LTF: Up Close and Personal	10 days

specific cell structures (i.e., nucleus, cell membrane, cell wall, ribosomes, mitochondria, chloroplasts, and vacuoles) for maintaining a stable environment.	LTF: Picturing Life Science Spot: The Incredible Edible Cell **Honors:** Cell Model Project: Students build a 3-D model of a cell.	
3. Construct an explanation of the function (e.g., mitochondria releasing energy during cellular respiration) of specific cell structures (i.e., nucleus, cell membrane, cell wall, ribosomes, mitochondria, chloroplasts, and vacuoles) for maintaining a stable environment.	**Chapter 2.3 Chemical Compounds in Cells** **Chapter 2.4 The Cell in Its Environment** Egg Osmosis Lab	4 days
5. Examine the cycling of matter between abiotic and biotic parts of ecosystems to explain the flow of energy and the conservation of matter. a. Obtain, evaluate, and communicate information about how food is broken down through chemical reactions to create new molecules that support growth and/or release energy as it moves through an organism. b. Generate a scientific explanation based on evidence for the role of photosynthesis and cellular respiration in the cycling of matter and flow of energy into and out of organisms.	**Chapter 3.1 Photosynthesis** **Biology Photosynthesis and Cell Respiration Line** **Chapter 3.2 Cellular Respiration** Bioman Biology Photosynthesis and Cellular Respiration: http://www.biomanbio.com/GamesandLabs/PhotoRespgames/photoresp.html	5 days
2. Gather and synthesize information to explain how prokaryotic and eukaryotic cells differ in structure and function, including the methods of asexual and sexual reproduction.	**Chapter 3.3 Cell Division** Cell Cycle Flipbook LTF: Multiplicity: Modeling the Cell Cycle **Honors:** LTF: Mitosis Mardi Gras Style	4 days

COS #1, 2, 3, 5	**Review**	4 days

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Second Nine Weeks

Heredity: Inheritance and Variation of Traits

Chapter 4 Vocabulary (4.1 - 4.4.)	**Section 4.1:** heredity, trait, genetics, fertilization, purebred, gene, allele, dominant allele, recessive allele, hybrid, Mendel **Section 4.2:** probability, Punnett square, phenotype, genotype, homozygous, heterozygous **Section 4.3:** incomplete dominance, codominance, multiple alleles, polygenic inheritance **Section 4.4:** meiosis, chromosome
Chapter 5 Vocabulary(5.1, 5.3, 5.5)	**Section 5.1**: nitrogen bases, DNA Replication, Watson, Crick **Section 5.3**: mutation, cancer, tumor, chemotherapy **Section 5.5**: selective breeding, inbreeding, hybridization, clone, genetic engineering, gene therapy

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Second Nine Weeks

Standard	Resources	Approximate Pacing Number of Days

12. Construct and use models (e.g., monohybrid crosses using Punnett squares, diagrams, simulations) to explain that genetic variations between parent and offspring (e.g., different alleles, mutations) occur as a result of genetic differences in randomly inherited genes located on chromosomes and that additional variations may arise from alteration of genetic information 12. Construct and use models (e.g., monohybrid crosses using Punnett squares, diagrams, simulations) to explain that genetic variations between parent and offspring (e.g., different alleles, mutations) occur as a result of genetic differences in randomly inherited genes located on chromosomes and that additional variations may arise from alteration of genetic information.	**Chapter 4.1 What is Heredity** **Chapter 4.2 Probability and Heredity** **Chapter 4.3 Patterns of Inheritance** **Chapter 4.4 Chromosomes and Inheritance** Science Spot: Sponge Bob Genetics Meiosis Square Dance Meiosis Square Dance Video Link Genetics Online Scavenger Hunt: Genetics Scavenger Hunt Link PhET Lab Simulation: Gene Expressions- The Basics Bioman Biology Meiosis: http://www.biomanbio.com/GamesandLabs/Genegames/genetics.html LTF: Punnett Square Exercises LTF: Gene Interactions LTF: Thumbs up LTF: Yellow Mice" AMSTI SDRO: Next Generation Hudson Alpha Genetics Kit **Honors:** LTF: "Gene Interactions" **Honors:** Genetic Disorders Brochure **Honors:** Family Tree Project **Honors:** STEMQuest - Funky Fruit Quest (Pearson Realize Platform) **Chapter 5.1 The Genetic Code** Hudson Alpha Genetics Kit PhET Lab Simulation: Stretching DNA **Honors**: DNA Model Project: Students build a 3-D model of DNA	20 days 8 days
13. Construct an explanation from evidence to describe how genetic mutations result in harmful, beneficial, or neutral effects to the structure and function of an organism.	**Chapter 5.3 Mutations** Mutations - Amoeba Sisters: http://www.amoebasisters.com/handouts.html Alien Encounters: https://nevelbiology.files.wordpress.com/2012/01/13-alienencountersstudent.pdf LTF: Going Bananas for DNA Hudson Alpha Genetics Kit - Strawberry DNA	8 days

14. Gather and synthesize information regarding the impact of technologies (e.g., hand pollination, selective breeding, genetic engineering, genetic modification, gene therapy) on the inheritance and/or appearance of desired traits in organisms.	**Chapter 5.5 Advances in Genetics** Hudson Alpha Genetics Kit Hudson Alpha Genetics Kit LInk	3 days
COS #12, 13, 14	**Review**	3 days

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Third Nine Weeks

From Molecules to Organisms: Structures and Processes

Chapter 9 Vocabulary (9.1 - 9.5)	**Section 9.1:** cell, cell membrane, nucleus, cytoplasm, tissue, muscle tissue, nervous tissue, connective tissue, epithelial tissue, organ, organ system **Section 9.2:** skeleton, skeletal muscle, joint, nutrient, absorption, gland, stimulus, response, hormone **Section 9.3:** homeostasis, stress **Section 9.4:** skeleton, vertebrae, joint, ligament, compact bone, spongy bone, marrow, cartilage, osteoporosis, hinge joint, ball-and-socket joint, gliding joint, pivot joint **Section 9.5:** involuntary muscle, voluntary muscle, skeletal muscle, tendon, smooth muscle, cardiac muscle, striated muscle, flexor, extensor
Chapter 8.4 Vocabulary (See Pearson Interactive - Chapter 12) Will need to supplement vocabulary and information with old book and/or other materials. Very little information on the digestive, circulatory, and respiratory systems in new book. New book has all three systems together in section 8.4.	**Pearson Interactive (Old Platform)** **Section 12.1:** calorie, enzyme, mechanical digestion, chemical digestion, mouth, saliva, esophagus, peristalsis, stomach, pancreas, small intestine, liver, bile, gallbladder, large intestine, villi, epiglottis, rectum **Section 12.2:** circulatory system (cardiovascular system), heart, atrium, ventricle, valve, artery, aorta, capillary, vein, hemoglobin, red blood cells, white blood cells, platelets, plasma, systemic circulation, pulmonary circulation **Section 12.3:** pharynx, trachea, cilia, bronchi, lungs, alveoli, diaphragm, larynx, vocal cords
Chapter 10 Vocabulary (10.1, 10.3)	**Section 10.1**: neuron, nerve impulse, nerve, synapse, central nervous system, peripheral nervous system, reflex, brain, cerebrum, cerebellum, medulla, spinal cord **Section 10.3**: fertilization, egg, sperm, zygote, testes, testosterone, scrotum, semen, penis, ovary, estrogen, fallopian tube, uterus, vagina, menstrual cycle, menstruation, ovulation

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Third Nine Weeks

Standard	Resources	Approximate Pacing Number of Days
4. Construct models and representations of organ systems (e.g., circulatory, digestive, respiratory, muscular, skeletal, nervous) to demonstrate how multiple interacting organs and systems work together to accomplish specific functions.	**Chapter 9.1 Body Organization** Body Systems Flipbook Introduction to the Human Body – Amoeba Sisters: Amoeba Sisters Handout Link LTF: Life-Size Scaling Science Spot: Human Body Quest Research Project **A.M.S.T.I. Investigating Digestion and Motion (2nd Nine Weeks)** **Honors:** STEMQuest - Peak Performance Plan (Pearson Realize Platform)	3 days
4. Construct models and representations of organ systems (e.g., circulatory, digestive, respiratory, muscular, skeletal, nervous) to demonstrate how multiple interacting organs and systems work together to accomplish specific functions.	**Chapter 9.2 System Interactions** **Chapter 9.3 Homeostasis** Homeostasis – Amoeba Sisters: http://www.amoebasisters.com/handouts.html	3 days
4. Construct models and representations of organ systems (e.g., circulatory, digestive, respiratory, muscular, skeletal, nervous) to demonstrate how multiple interacting organs and systems work together to accomplish specific functions.	**Chapter 9.4 The Skeletal System** Dem Bones Activity Virtual Hip Replacement – Ed Heads LTF: Levers R Us	4 days

4. Construct models and representations of organ systems (e.g., circulatory, digestive, respiratory, muscular, skeletal, nervous) to demonstrate how multiple interacting organs and systems work together to accomplish specific functions.	**Chapter 9.5 The Muscular System** **Muscular System Diagram Link** ***Change quarters on website for resources for other units on the body systems.**	4 days
4. Construct models and representations of organ systems (e.g., circulatory, digestive, respiratory, muscular, skeletal, nervous) to demonstrate how multiple interacting organs and systems work together to accomplish specific functions.	**Pearson Interactive 12.1 Digestion** LTF: Antacid Analysis LTF: Chew on This Digestive System Link	4 days
4. Construct models and representations of organ systems (e.g., circulatory, digestive, respiratory, muscular, skeletal, nervous) to demonstrate how multiple interacting organs and systems work together to accomplish specific functions.	**Pearson Interactive 12.2 Circulatory System** LTF: A Fishy Tale LTF: How Does Your Heart Rate	4 days
4. Construct models and representations of organ systems (e.g., circulatory, digestive, respiratory, muscular, skeletal, nervous) to demonstrate how multiple interacting organs and systems work together to accomplish specific functions.	**Pearson Interactive 12.3 Respiratory System**	4 days
4. Construct models and representations of organ systems (e.g., circulatory, digestive, respiratory,	**Chapter 10.1 The Nervous System** LTF: Popcorn Dice & Everything Nice PhET Lab Simulation: Neuron	3 days

muscular, skeletal, nervous) to demonstrate how multiple interacting organs and systems work together to accomplish specific functions.		
4. Construct models and representations of organ systems (e.g., circulatory, digestive, respiratory, muscular, skeletal, nervous) to demonstrate how multiple interacting organs and systems work together to accomplish specific functions.	**Chapter 10.3 The Male and Female Reproductive Systems**	3 days
4. Construct models and representations of organ systems (e.g., circulatory, digestive, respiratory, muscular, skeletal, nervous) to demonstrate how multiple interacting organs and systems work together to accomplish specific functions. COS #4	**Review** Human Body Corporation Letter: Select an organ and convince your "boss" why you are important for the function of the corporation and should keep your job; Name the organ, the organ system you belong to, your function in the system and organization, and which organs you work well with. Make A Frog Sandwich **Honors:** Frog Dissection	3 days

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Fourth Nine Weeks

Ecosystems: Interactions, Energy, & Dynamics

Unity & Diversity

Chapter 11 Vocabulary (11.2 - 11.3)	**Section 11.1:** organism, habitat, biotic factor, abiotic factor, species, population, community, ecosystem, ecology **Section 11.2:** birth rate, death rate, immigration, emigration, population density, limiting factor, carrying capacity **Section 11.3:** natural selection, adaptation, niche, competition, predation, predator, prey, symbiosis, parasitism, mutualism, commensalism, parasite, host
Chapter 12 Vocabulary (12.1, 12.2, 12.4)	**Section 12.1:** producer, consumer, herbivore, carnivore, omnivore, scavenger, decomposer, food chain, food web, energy pyramid, desertification **Section 12.2:** evaporation, condensation, precipitation, nitrogen fixation **Section 12.4:** estuary, intertidal zone, neritic zone
Chapter 7 Vocabulary (7.5)	**Section 7.5:** tropism, hormone, auxin, photoperiodism, critical night length, short-day plant, long-day plant, day-neutral plant, dormancy
Chapter 13 Vocabulary (13.1, 13.3, 13.4)	**Section 13.1:** succession, primary succession, pioneer species, secondary succession **Section 13.3:** biodiversity, keystone species, gene, extinction, endangered species, threatened species, habitat destruction, habitat fragmentation, poaching, captive breeding **Section 13.4:** biogeography, continental drift, dispersal, exotic species
Chapter 6 Vocabulary (6.3 & 6.4)	**Section 6.3:** species, fossil, adaptation, evolution, natural selection, habitat, variation **Section 6.4:** homologous structures

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Fourth Nine Weeks

Standard	Resources	Approximate Pacing Number of Days
5. Examine the cycling of matter between abiotic and biotic parts of ecosystems to explain the flow of energy and the conservation of matter. a. Obtain, evaluate, and communicate information about how food is broken down through chemical reactions to create new molecules that support growth and/or release energy as it moves through an organism. b. Generate a scientific explanation based on evidence for the role of photosynthesis and cellular respiration in the cycling of matter and flow of energy into and out of organisms. 6. Analyze and interpret data to provide evidence regarding how resource availability impacts individual organisms as well as populations of organisms within an ecosystem.	**Chapter 11.1 Living Things and the Environment** **Chapter 11.2 Populations** Natural Selection and Evolution Lab with Teddy Grahams (Populations) http://www.gcisd-k12.org/cms/lib/TX01000829/Centricity/Domain/622/NaturalSelectionTeddyGrahamLab.pdf **Honors:** STEMQuest - To Cross or Not to Cross (Pearson Realize Platform)	5 days

8. Construct an explanation to predict patterns of interactions in different ecosystems in terms of the relationships between and among organisms (e.g., competition, predation, mutualism, commensalism, parasitism).	**Chapter 11.3 Interactions Among Living Things** LTF: Baby Dice Island LTF: Clouds, Cockatoo, & Cactus Oh My	3 days
10. Use evidence and scientific reasoning to explain how characteristic animal behaviors (e.g., building nests to protect young from cold, herding to protect young from predators, attracting mates for breeding by producing special sounds and displaying colorful plumage, transferring pollen or seeds to create conditions for seed germination and growth) and specialized plant structures (e.g., flower brightness, nectar, and odor attracting birds that transfer pollen; hard outer shells on seeds providing protection prior to germination) affect the probability of successful reproduction of both animals and plants.	**Chapter 11.3 Interactions Among Living Things** **Honors**: Research Project to Investigate Relationships Between Organisms and the Environment; Examples: Endangered Species; Protecting/ preserving Rainforests; Wildlife Conservation; Pollution; Global Climate Change; Energy Conservation; Waste Management; Human Overpopulation; Genetically modified crops and animals. **Honors:** STEMQuest - Construction Without Destruction (Pearson Realize Platform) Small Lab: Particle Predator	3 days
18. Construct an explanation from evidence that natural selection acting over generations may lead to the predominance of certain traits that support successful survival and reproduction of a population.	**Chapter 11.3 Interactions Among Living Things** LTF: Bean Bunny Evolution PhET Lab Simulation: Natural Selection Small Lab: Disease Transmission	3 days

5. Examine the cycling of matter between abiotic and biotic parts of ecosystems to explain the flow of energy and the conservation of matter. a. Obtain, evaluate, and communicate information about how food is broken down through chemical reactions to create new molecules that support growth and/or release energy as it moves through an organism. b. Generate a scientific explanation based on evidence for the role of photosynthesis and cellular respiration in the cycling of matter and flow of energy into and out of organisms.	**Chapter 12.1 Energy Flow in Ecosystems** **Chapter 12.2 Cycles of Matter** Food Webs, Energy Pyramids, and Intro to Biodiversity - Amoeba Sisters: http://www.amoebasisters.com/handouts.html LTF: Field of Beans	5 days
11. Analyze and interpret data to predict how environmental conditions (e.g., weather, availability of nutrients, location) and genetic factors (e.g., selective breeding of cattle or crops) influence the growth of organisms (e.g., drought decreasing plant growth, adequate supply of nutrients for maintaining normal plant growth, identical plant seeds growing at different rates in different weather conditions, fish growing larger in large ponds than in small ponds).	**Chapter 12.4 Aquatic Ecosystems** **Honors:** Bottle Biology (Aquatic Ecosystem in a Bottle) Aquatic Ecosystem in a Bottle Link **Chapter 7.5 Plant Responses and Growth**	6 days
7. Use empirical evidence from patterns and data to demonstrate how changes to physical or biological components of an ecosystem (e.g., deforestation, succession, drought, fire, disease, human activities, invasive species) can lead to shifts in populations.	**Chapter 13.1 Changing Ecosystems**	3 days

9. Engage in argument to defend the effectiveness of a design solution that maintains biodiversity and ecosystem services (e.g., using scientific, economic, and social considerations regarding purifying water, recycling nutrients, preventing soil erosion).	**Chapter 13.3 Biodiversity** **Bill Nye Video - Biodiversity (Teacher Tube)** **Research Project: Keystone Species** (follow Differentiated Instruction p. 559) **Chapter 13.4 Biogeography** LTF: Toothpick Birds LTF: Tragedy in the Making Pangea Project - USGS Fossil and Mountain Chain Evidence or Wegener's Puzzling Continents	5 days
10. Use evidence and scientific reasoning to explain how characteristic animal behaviors (e.g., building nests to protect young from cold, herding to protect young from predators, attracting mates for breeding by producing special sounds and displaying colorful plumage, transferring pollen or seeds to create conditions for seed germination and growth) and specialized plant structures (e.g., flower brightness, nectar, and odor attracting birds that transfer pollen; hard outer shells on seeds providing protection prior to germination) affect the probability of successful reproduction of both animals and plants.	**Chapter 6.3 Darwin's Theory** LTF: Beak vs Food LTF: Bean Bunny Evolution **Honors:** LTF: Create a Species Small Lab: Particle Predator	5 days

15. Analyze and interpret data for patterns of change in anatomical structures of organisms using the fossil record and the chronological order of fossil appearance in rock layers. 16. Construct an explanation based on evidence (e.g., cladogram, phylogenetic tree) for the anatomical similarities and differences among modern organisms and between modern and fossil organisms, including living fossils (e.g., alligator, horseshoe crab, nautilus, coelacanth). 17. Obtain and evaluate pictorial data to compare patterns in the embryological development across multiple species to identify relationships not evident in the adult anatomy.	**Chapter 6.4 Evidence of Evolution** Evidence of Evolution Lab: http://www.polk.k12.ga.us/userfiles/682/Classes/1442/Evidence%20of%20Evolution%20Lab.pdf Nova Labs: Fossils: Rocking the Earth http://www.pbs.org/wgbh/nova/labs/lab/evolution/2/1/	6 days
COS # 5, 6, 7, 8, 9, 10, 11, 15, 16, 17, 18	**Review**	3 days
Objective: Identify steps in the scientific method.	**Revisit science skills material taught throughout the year to prepare for 8th grade Physical Science**	3 days

Alabama Technology Course of Study

Sixth – Eighth Grade Overview

Students in Grades 6-8 possess a wide range of intellectual abilities, learning styles, talents, and interests. These students are experiencing a transitional period that includes physical, social, emotional, and intellectual changes. In addition, students are developing skills to function in a technological society.

The technology content standards for Grades 6-8 are designed to complement all areas of the academic curriculum. In a world where information increases exponentially, students are expected to develop and use critical-thinking and decision-making skills. Digital tools enhance middle school students' emerging abilities to analyze, synthesize, and evaluate information. The integration of technology systems expands and optimizes their ability to use information and to communicate and collaborate with diverse individuals. It is critical for students at these grade levels to expand the knowledge and skills necessary for solving both hypothetical and authentic problems.

In a global world community, students are expected to be responsible digital citizens who practice safe, legal, and responsible use of technology systems and digital media. Students must comprehend the impact of technology on the cultural, social, economic, environmental, and political aspects of society. Positive attitudes toward technology use are essential to support collaboration, learning, and productivity for success in the twenty-first century.

Technology Operations and Concepts

Students will:

1. Appraise technology systems to determine software and hardware compatibility.
2. Publish digital products that communicate curriculum concepts.
    - Examples: Web pages, videos, podcasts, multimedia presentations

3. Explain how network systems are connected and used.
Examples: file sharing, collaborating, wireless networking

4. Determine basic troubleshooting strategies to correct common hardware and software problems.
Examples: checking connections, restarting equipment, creating a backup copy of digital data
    • Describing the importance of antivirus and security software

5. Use basic features of word processing, spreadsheets, databases, and presentation software.
Examples: word processing—reports, letters, brochures spreadsheets—discovering patterns, tracking spending, creating budgets databases—contact list of addresses and telephone numbers presentation software—slideshow

6. Select specific digital tools for completing curriculum-related tasks.
Examples: spreadsheet for budgets, word processing software for essays, probes for data collection

7. Demonstrate correct keyboarding techniques.

Digital Citizenship

8. Identify safe uses of social networking and electronic communication.
    - Recognizing dangers of online predators
    - Protecting personal information online

9. Practice responsible and legal use of technology systems and digital content.
    - Examples: avoiding plagiarism; complying with acceptable-use policies, copyright laws, and fair use standards; recognizing secure Web site Identifying examples of computer crime and related penalties
    - Examples: computer crime—phishing, spoofing, virus and worm dissemination, cyberbullying penalties—fines, incarceration Citing sources of digital content

10. Describe advances in technology and effects of each on the workplace and society.
    - Examples: agriculture, manufacturing, medicine, warfare, transportation, communication, education

Research and Information Fluency

11. Use digital tools and strategies to locate, collect, organize, evaluate, and synthesize information.
    - Examples: locating—Boolean searches, graphic organizers, spreadsheets, databases, collecting—probeware, graphing calculators
      organizing—graphic organizers, spreadsheets
      evaluating—reviewing publication dates, determining credibility
      synthesizing—word processing software, concept-mapping software

Communication and Collaboration

12. Use digital tools to communicate and collaborate at all levels from interpersonal to global.
    - Examples: instant messages, e-mail, blogs, wikis, collaborative authoring tools, online learning communities
      Demonstrating digital file transfer
      Examples: attaching, uploading, downloading

Critical Thinking, Problem Solving, and Decision Making

13. Use digital tools to formulate solutions to authentic problems.
Examples: electronic graphing tools, probes, spreadsheets

Creativity and Innovation

14. Use digital tools to generate new ideas, products, or processes.
    - Examples: ideas—predictions, trends
      products—animation, video
      processes—models, simulations