

2017-2018 CPSD SCIENCE PACING GUIDE



Biology II

Canton Public Schools Biology II Pacing Guide 2017 - 2018

Biology II 1 st - 4 th 9 Weeks		
Competency 1 - Inquiry		Mastery
Apply inquiry-based and problem-solving processes and skills to scientific investigations.		
1a	Use current technologies such as CD-ROM, DVD, Internet, and on-line data search to explore current research related to a specific topic. (DOK 3)	1* 2* 3* 4*
1b	Clarify research questions and design laboratory investigations. (DOK 3)	1* 2* 3* 4*
1c	Demonstrate the use of scientific inquiry and methods to formulate, conduct, and evaluate laboratory investigations (e.g., hypotheses, experimental design, observations, data analyses, interpretations, theory development). (DOK 3)	1* 2* 3* 4*
1d	Organize data to construct graphs (e.g., plotting points, labeling x-and y-axis, creating appropriate titles and legends for circle, bar, and line graphs), draw conclusions, and make inferences. (DOK 3)	1* 2* 3* 4*
1e	Evaluate procedures, data, and conclusions to critique the scientific validity of research. (DOK 3)	1* 2* 3* 4*
1f	Formulate and revise scientific explanations and models using logic and evidence (data analysis). (DOK 3)	1* 2* 3* 4*
1g	Collect, analyze, and draw conclusions from data to create a formal presentation using available technology (e.g., computers, calculators, SmartBoard, CBL's, etc.) (DOK 3)	1* 2* 3* 4*
Competency 2 – Physical Science		Mastery
Describe and contrast the structures, functions, and chemical processes of the cell.		
2a	Relate the structure and function of a selectively permeable membrane to its role in diffusion and osmosis. (DOK 2)	1* 2 3 4
2b	Summarize how cell regulation controls and coordinates cell growth and division. (DOK 2)	1* 2 3 4
2c	Analyze and describe the function of enzymes in biochemical reactions. (DOK 2) <ul style="list-style-type: none"> • The impact of enzymatic reactions on biochemical processes • Factors that affect enzyme function (e.g., pH, concentration, temperature, etc.) 	1* 2 3 4
2d	Differentiate between photosynthesis and cellular respiration. (DOK 2) <ul style="list-style-type: none"> • Cellular sites and major pathways of anaerobic and aerobic respiration (with reactants, 	1* 2 3 4

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	<p>products, and ATP per monosaccharide)</p> <ul style="list-style-type: none"> Cellular respiration with respect to the sites at which they take place, the reactions involved, and the energy input and output in each stage (e.g., glycolysis, Krebs cycle, electron transport chain) Pigments, absorption, reflection of light, and light-dependent and light-independent reactions of photosynthesis Oxidation and reduction reactions 	
Competency 3 – Life Science		Mastery
Investigate and discuss the molecular basis of heredity.		
3a	Explain how the process of meiosis clarifies the mechanism underlying Mendel’s conclusions about segregation and independent assortment on a molecular level. (DOK 1)	1 2* 3 4
3b	Research and explain how major discoveries led to the determination of DNA structure. (DOK 2)	1 2* 3 4
3c	<p>Relate gene expression (e.g., replication, transcription, translation) to protein structure and function. (DOK 2)</p> <ul style="list-style-type: none"> Translation of a messenger RNA strand into a protein Processing by organelles so that the protein is appropriately packaged, labeled, and eventually exported by the cell Messenger RNA codon charts to determine the effects of different types of mutations on amino acid sequence and protein structure (e.g., sickle cell anemia resulting from base substitution mutation) Gene expression regulated in organisms so that specific proteins are synthesized only when they are needed by the cell (e.g., allowing cell specialization) 	1 2* 3 4
3d	<p>Assess the potential implications of DNA technology with respect to its impact on society. (DOK 3)</p> <ul style="list-style-type: none"> Modern DNA technologies (e.g., polymerase chain reaction (PCR), gene splicing, gel electrophoresis, transformation, recombinant DNA) in agriculture, medicine and forensics 	1 2* 3 4
3e	Develop a logical argument defending or refuting bioethical issues arising from applications of genetic technology (e.g., the human genome project, cloning, gene therapy, stem cell research). (DOK 3)	1 2* 3 4
Competency 4 - Life Science		Mastery

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Demonstrate an understanding of the factors that contribute to evolutionary theory and natural selection.		
4a	Explain the history of life on Earth and infer how geological changes provide opportunities and constraints for biological evolution. (DOK 2) <ul style="list-style-type: none"> • Main periods of the geologic timetable of Earth's history • Roles of catastrophic and gradualistic processes in shaping planet Earth 	1 2 3* 4
4b	Provide support for the argument based upon evidence from anatomy, embryology, biochemistry, and paleontology that organisms descended with modification from common ancestry. (DOK 2)	1 2 3* 4
4c	Identify and provide supporting evidence for the evolutionary relationships among various organisms using phylogenetic trees and cladograms. (DOK 2)	1 2 3* 4
4d	Formulate a scientific explanation based on fossil records of ancient life-forms and describe how new species could originate as a result of geological isolation and reproductive isolation. (DOK 2)	1 2 3* 4
4e	Compare and contrast the basic types of selection (e.g., disruptive, stabilizing, directional, etc.) (DOK 2)	1 2 3* 4
4f	Cite examples to justify behaviors that have evolved through natural selection (e.g., migration, parental care, use of tools, etc.) (DOK 1)	1 2 3* 4
4g	Research and explain the contributions of 19 th century scientists (e.g., Malthus, Wallace, Lyell, Darwin) on the formulation of ideas about evolution. (DOK 2)	1 2 3* 4
4h	Develop a logical argument describing ways in which the influences of 20 th century science have impacted the development of ideas about evolution (e.g., synthetic theory of evolution, molecular biology). (DOK 3)	1 2 3* 4
4i	Analyze changes in an ecosystem resulting from natural causes (succession), changes in climate, human activity (pollution and recycling), or introduction of non-native species. (DOK 2)	1 2 3* 4
Competency 5 – Life Science		Mastery
Develop an understanding of organism classification.		
5a	Classify organisms according to traditional Linnaean classification characteristics (e.g., cell structure, biochemistry, anatomy, fossil record, methods of reproduction) and the cladistic approach. (DOK 2)	1 2 3 4*
5b	Categorize organisms according to the characteristics that distinguish them as Bacteria, Archaea, or Eucarya. (DOK 1) <ul style="list-style-type: none"> • Bacteria, fungi, and protists 	1 2 3 4*

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	<ul style="list-style-type: none">• Characteristics of invertebrates (e.g., habitat, reproduction, body plan, locomotion) as related to phyla (e.g., Porifera, Cnidarians, Nematoda, Annelida, Platyhelminthes, and Arthropoda) and classes (e.g., Insecta, Crustacea, Arachnida, Mollusca, Echinodermata)• Characteristics of vertebrates (e.g., habitat, reproduction, body plan, locomotion) as related to classes (e.g., Agnatha, Chondrichthyes, Osteichthyes, Amphibia, Reptilia, Aves, Mammalia)• Nomenclature of various types of plants (e.g., Bryophyta, Tracheophyta, Gymnospermae, Angiospermae, Monocotyledonae, Dicotyledonae, vascular plants, nonvascular plants).	
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Pacing Guide Overview 2017 – 2018**

Biology II							
1st Term		2nd Term		3rd Term		4th Term	
1a	2a	3a	4a	4f	5a		
1b	2b	3b	4b	4g	5b		
1c	2c	3c	4c	4h			
1d	2d	3d	2d	4i			
1e		3e	4d				
1f			4e				
1g							