# TEXAS BIOLOGY RESOURCES

■ Text Resources ■ Digital Resources ■ Classroom Kits (Available from Carolina Biological)

#### **Cell Structure and Function**

- **SB.4.A** Compare and contrast prokaryotic and eukaryotic cells, including their complexity, and compare and contrast scientific explanations for cellular complexity
- **S.B.4.B** Investigate and explain cellular processes, including homeostasis and transport of molecules; and
- **S.B.5.A** Describe the stages of the cell cycle, including deoxyribonucleic acid (DNA) replication and mitosis, and the importance of the cell cycle to the growth of organisms.
- **S.B.5.C** Recognize that disruptions of the cell cycle lead to diseases such as cancer

■ iCell<sup>®</sup>



- HudsonAlpha Meiosis Video www.youtube.com/watch?v=9sJU9-ellrs
- Collecting Cancer Causing Changes



■ **Guidebook:** Foundational Concepts and Applications: Cancer, Stem Cells



### **Mechanisms of Genetics**

- **S.B.6** The student know the mechanisms of genetics such as the role of nucleic acids and the principles of Mendelian and non-Mendelian genetics.
- **S.B.6** A Identify the components of DNA, identify how information for specifying the traits of an organism is carried in the DNA, examine scientific explanations for the origin of DNA
- **S.B.6.B** Recognize that components that make up the genetic codes are common to all organisms
- **S.B.6.C** Explain the purpose and process of transcription and translation using models of DNA and RNA
- **S.B.6.D** recognize that gene expression is a regulated process
- **S.B.6.E** Identify and illustrate changes in DNA and evaluate the significance of these changes
- **S.B.6.F** Predict possible outcomes of various genetic combinations such as monohybrid crosses, dihybrid crosses, and non-Mendelian inheritance
- **S.B.6.G** Recognize the significance of meiosis to sexual reproduction.

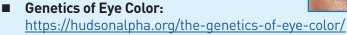
■ **Guidebook:** Foundational Concepts and Applications: DNA Sequencing, Recombinant DNA and genetic Engineering, Synthetic Biology, RNA and Protein Analyses, Gene Therapy and RNAi, Stem Cells; Therapeutic Approaches: Gene Therapy, Copy Number Variation, Personal Genome Analysis







- HNPCC®
- Genes & ConSEQUENCES®
- **■** Chromosock Meiosis



■ **Progress of Science:** Biotechnology Timeline™







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### **Biological Evolution and Classification**

- **S.B.7** The student knows evolutionary theory is a scientific explanation for the unity and diversity of life.
- **S.B.7** A Analyze and evaluate hoe evidence of common ancestry among groups is provided by the fossil records, biogeography, and homologies, including anatomical, molecular and developmental.
- **S.B.7.D** Analyze and evaluate how the elements of natural selection including inherited variation, the potential of a population to produce more offspring than can survive and a finite supply of environmental resources, result in differential reproductive success.
- **S.B.7.E** Analyze and evaluate the relationship of natural selection to adaptation and to the development of diversity in and among species.
- S.B.7.F Analyze other evolutionary mechanisms, including genetic drift, gene glow, mutation and recombination

- Guidebook: Foundational Concepts and Applications: Comparative Genomics, Studying the Genome to Understand the Sequence
- **Shareable Science:** The Science of Skin Color https://hudsonalpha.org/ the-science-of-skin-color/



**Human Genome Diversity Project** https://hudsonalpha.org/human-genome-diversity-project/

### **Interdependence within Environmental Systems**

- **S.B.11** A summarize the role of microorganism in both maintaining and disrupting the health of both organisms and ecosystems
- **S.B.11** A Summarize the role of microorganisms in both maintaining and disrupting the health of both organisms and ecosystems
- Guidebook: Foundational Concepts and Applications: Agriculture: Sequencing Plant Genomes for Food and Bioenergy Needs, Comparative Genomics, Recombinant DNA and Genetic engineering: Agriculture.





### **Metabolic Process and Energy**

- S.B.9 The student know the significance of various molecules involved in metabolic processes and energy conversions that occur in living organisms.
- **S.B.9.A** Compare the Functions of different types of biomolecules. including carbohydrates, lipids, proteins and nucleic acids
- **S.B.9.B** Compare the reactants and products of photosynthesis and cellular respiration in terms of energy, energy conversions and matter
- S.B.9.C Identify and investigate the role of enzymes

- Guidebook: Foundational Concepts and Applications: DNA Sequencing, RNA and Protein Analyses, Recombinant DNA and Genetic engineering, Synthetic Biology, Pharmacogenomics
- **BioBeads:** Modeling Cell Processes https://hudsonalpha.org/compendium-resources/
- Guidebook: Genetics, Plant Growth and Photosynthesis (pgs. 20-21 of 2018-19)
- Enzymes to Go!® to purchase contact edoutreach@hudsonalpha.org