

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

While no single activity can be expected to fully address any three-dimensional standard of the NGSS, the highlighted HudsonAlpha kits, materials and resources can help educators bring updated genetics and genomics content to their planned instructional sequence.

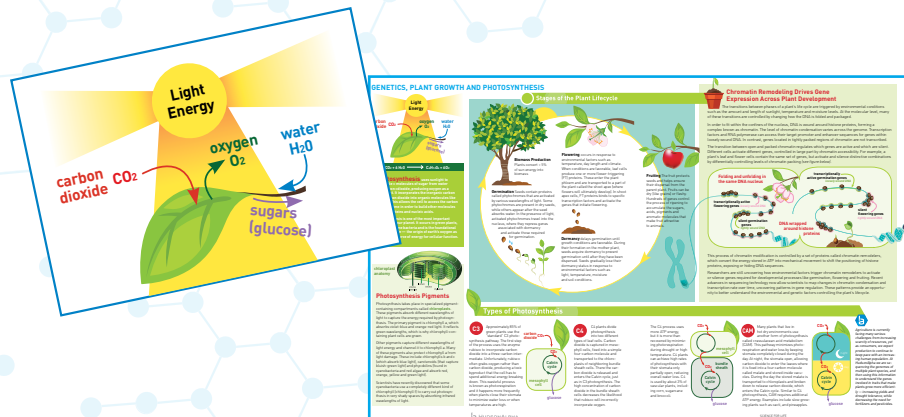
NGSS 9-12 Life Science Standards

HS-LS1-1 From Molecules to Organisms: Structures and Processes

Construct an explanation based on evidence for how the structure of DNA determines the structure of proteins which carry out the essential functions of life through systems of specialized cells.

HS-LS1-3 From Molecules to Organisms: Structures and Processes

Plan and conduct an investigation to provide evidence that feedback mechanisms maintain homeostasis.



HudsonAlpha Resources

■ iCell®

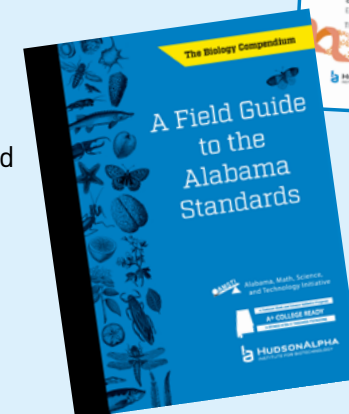
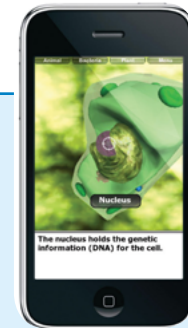
■ Expanded DNA Extraction
7th Grade Genetics and Biotechnology Module
(only available for purchase from HudsonAlpha)

■ Genes & ConSEQUENCES®*

■ ■ **Guidebook:** Foundational Concepts and Applications, Copy Number Variation, Identifying Genetic influence on Disease, Personal Genome Analysis, Genetics of Eye Color, Studying the Genome to Understand the Sequence
<https://hudsonalpha.org/biotech-basics/>

■ ■ **Guidebook:** 2018/19 Guidebook Genetics, Plant Growth, and Photosynthesis (Pgs. 20-21) <https://s3.amazonaws.com/hudsonalpha/wp-content/uploads/2018/10/09124148/Guidebook-2018-2019.pdf>

■ ■ **Biobeads:**
Modeling Cell Processes
(teacher-developed lesson)
Alien Gases (teacher-developed lesson) *Biology Compendium*



NGSS 9-12 Life Science Standards

HS-LS1-6 From Molecules to Organisms: Structures and Processes

Construct and revise an explanation based on evidence for how carbon, hydrogen, and oxygen from sugar molecules may combine with other elements to form amino acids and/or other large carbon-based molecules.



HS-LS3-1 Heredity: Inheritance and Variation of Traits

Ask questions to clarify relationships about the role of DNA and chromosomes in coding the instructions for characteristic traits passed from parents to offspring

HS-LS3-2 Heredity: Inheritance and Variation of Traits

Make and defend a claim based on evidence that inheritable genetic variations may result from (1) new genetic combinations through meiosis, (2) viable errors occurring during replication, and/or (3) mutations caused by environmental factors.



HHS-LS1-4

Use a model to illustrate the role of cellular division (mitosis) and differentiation in producing and maintaining complex organisms

HudsonAlpha Resources

■ ■ **Guidebook:** Foundational Concepts and Applications RNA and Protein Analysis, Synthetic Biology, Pharmacogenomics
<https://hudsonalpha.org/biotech-basics/>

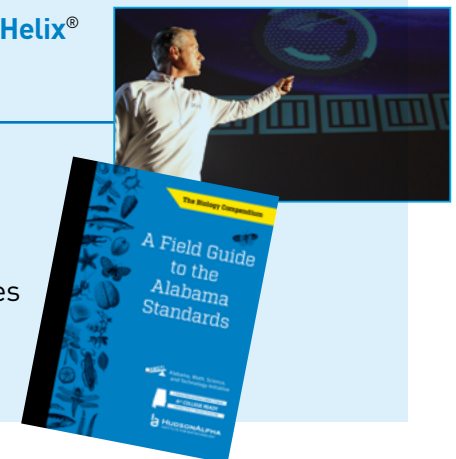
■ ■ **Guidebook:** 2018/19 Guidebook Genetics, Plant Growth, and Photosynthesis (Pgs. 20-21)
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■ Progress of Science Biotechnology Timeline™



- Chromosocks Meiosis®*
- Modeling Mendel's Laws®*
- Genes and ConSEQUENCES®*
- Disorder Detectives®*
- HNPCC®*
- Collecting Cancer-Causing Changes®*
- Making Sense of Uncertainty®*
- Touching Triton®*
- HG Helix®

- Chromosocks Meiosis®*
- Modeling Mendel's Laws®*
- Mitosis for Chromosocks protocol—available on the Compendium resources page Biology Compendium



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HS-LS3-3 Heredity: Inheritance and Variation of Traits

Apply concepts of statistics and probability to explain the variation and distribution of expressed traits in a population.

HA-LS4-3 Biological Evolution: Unity and Diversity

Apply concepts of statistics and probability to support explanations that organisms with an advantageous heritable trait tend to increase in proportion to organisms lacking this trait.

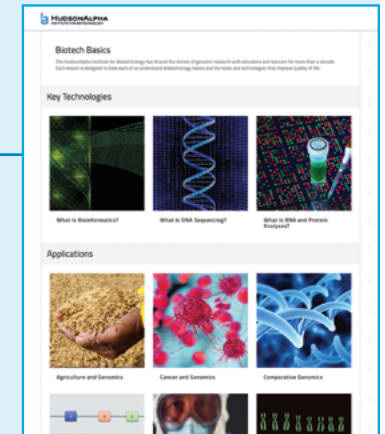
HS-LS4-2 Biological Evolution: Unity and Diversity

Construct an explanation based on evidence that the process of evolution primarily results from four factors: (1) the potential for a species to increase in number, (2) the heritable genetic variation of individuals in a species due to mutation and sexual reproduction, (3) competition for limited resources, and (4) the proliferation of those organisms that are better able to survive and reproduce in the environment.



■ ■ **Guidebook:** Foundational Concepts and Applications: Comparative Genomics, Studying the Genome to Understand the Sequence

<https://hudsonalpha.org/biotech-basics>



■ **Shareable Science:** "Human Genome Diversity Project" <https://hudsonalpha.org/shareable-science/>

■ **Agricultural Genomics** <https://s3.amazonaws.com/hudsonalpha/wp-content/uploads/2018/10/09124148/Guidebook-2018-2019.pdf>

