

Seventh Grade Science Curriculum Bundle #9

Title	Suggested Dates
Genetics	Feb 22-Mar 11, 2011 (14 days)



Big Idea/Enduring Understanding	Guiding Questions
DNA found in the nucleus of eukaryotic cells carries the genetic information that passes from cell to cell and that offspring inherit from parents.	What are genes? How are genes inherited? Who is Gregor Mendel, and what are the simple inheritance patterns?

The resources included here provide teaching examples and/or meaningful learning experiences to address the District Curriculum. In order to address the TEKS to the proper depth and complexity, teachers are encouraged to use resources to the degree that they are congruent with the TEKS and research-based best practices. Teaching using only the suggested resources does not guarantee student mastery of all standards. Teachers must use professional judgment to select among these and/or other resources to teach the district curriculum.

Knowledge & Skills with Student Expectations	Specificity & Examples	Suggested Resources (Read the note above)
Reminder: The state <i>requires</i> 40% of instructional time be spent conducting lab and field investigations. (approximately 2 investigations per week) Safety equipment should be used throughout the entire school year. Process skills (TEKS 7.1, 7.2, 7.3, and 7.4) should be used throughout the school year.		
<p>14 Organisms and environments. The student knows that reproduction is a characteristic of living organisms and that the instructions for traits are governed in the genetic material. The student is expected to:</p> <p>14A define heredity as the passage of genetic instructions from one generation to the next generation</p>	<p>Benchmark (national standard):</p> <ul style="list-style-type: none"> • The same genetic information is copied in each cell of the new organism. (Source: Benchmarks) <p><u>Teacher Note:</u> Passing on genes occurs in all cells, prokaryotic and eukaryotic. Students may have the misconception that just because a cell does not have a nucleus that it does not have DNA (genes).</p>	<p>Vocabulary: Genetics, heritability, generation, descendents, ancestors, generation, offspring, asexual reproduction, sexual reproduction</p> <p>Power Point:</p> <ul style="list-style-type: none"> • Introduction to Genetics.ppt <p>Activities:</p> <ul style="list-style-type: none"> • Passing Traits from One Generation to Next • Mitosis and Meiosis Puzzle.pdf – This activity is provided only for advanced classes that seek a bridge between cellular processes (mitosis and meiosis) and the bigger picture of reproduction and development/repair. Mitosis and meiosis are not necessary to cover at this level. <p>Reading Supplement::</p> <ul style="list-style-type: none"> • Textbook: p. 240

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<p>14 Organisms and environments. The student knows that reproduction is a characteristic of living organisms and that the instructions for traits are governed in the genetic material. The student is expected to:</p> <p>14B compare the results of uniform or diverse offspring from sexual reproduction or asexual reproduction</p>	<p>Benchmarks (national standard):</p> <ul style="list-style-type: none"> • In some kinds of organisms, all the genes come from a single parent. • In organisms that have two sexes, typically half of the genes come from each parent. • In sexual reproduction, a single specialized cell from a female merges with a specialized cell from a male. • Reproduction is necessary for the survival of any species. <p>Asexually reproduced populations become diverse through DNA mutations. Sexually reproduced populations may diversity (have variation) from offspring being results of merging female and male gametes, though mutations also add diversity. Mutations though are only passed on to subsequent generations if the DNA alterations occur in the gametes rather than somatic cells.</p> <p><u>Teacher Note:</u> Students may have the common misconceptions that male children inherit only traits from the father (and vice versa), that children only inherit traits from the mother, or that all traits are a blending of the two parents. Teachers may need to clarify for sexually reproduced organisms, the fusion of sperm and egg forms the zygote (fertilized egg), which is the first cell off the offspring with gene recombination from both parents. Genes are then expressed following inheritance patterns as described in the teacher note below.</p>	<p>Power Point:</p> <ul style="list-style-type: none"> • Introduction to Genetics.ppt <p>Reading Supplement:</p> <ul style="list-style-type: none"> • Textbook: pp 198-201 (cell replication), pp 247-253 (asexual/sexual reproduction) <p>Multimedia:</p> <ul style="list-style-type: none"> • BrainPop: Asexual Reproduction (Science / Cellular Life and Genetics)
<p>14 Organisms and environments. The student knows that reproduction is a characteristic of living organisms and that the instructions for traits are governed in the genetic material. The student is expected to:</p> <p>14C recognize that inherited traits of individuals are governed in the genetic material found in the genes within chromosomes in the nucleus</p>	<p>Benchmark (National Standard):</p> <ul style="list-style-type: none"> • Small differences between parents and offspring can accumulate (through selective breeding) in successive generations so that descendents are very different from their ancestors. <p><u>Teacher Note:</u> Students often have difficulty visualizing how DNA (genes) become the physical traits (phenotype). In high school biology (Bio.6C), students will learn the mechanisms of transcription and translation that better explain this to them, but at this stage, if students understand that genes are the blueprints for building all the components of an organism, they may</p>	<p>Power Point:</p> <ul style="list-style-type: none"> • Genes and Heritability (part 1).ppt • Genes and Heritability (part 2) Inheritance patterns.ppt <p>Activities:</p> <ul style="list-style-type: none"> • What is DNA • Extracting DNA • Cracking the Genetic Code.pdf • Dominant Recessive Class Activity • Investigating the Results of Inherited Traits.doc

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	<p style="color: red;">better draw a relationship between genotype and phenotype.</p> <p style="color: red;">Though it is easy for students to use Punnett Squares to predict inheritance pattern outcomes, they might not be able to articulate a relationship between genotype and phenotype. It is more important for students to relate DNA to traits of simple inheritance patterns by having a strong understanding of dominant vs. recessive, homozygous vs. heterozygous. <i>A student who understands this can make predictions about inheritance patterns without using Punnett Squares.</i> Monohybrid, dihybrid, and non-Mendelian crosses will be studied in biology (Bio.6E) that rely on knowledge acquired in 7th grade.</p>	<p>PreAP Activities:</p> <ul style="list-style-type: none"> • LTF #4 Goin’ Bananas for DNA • Heredity Mix and Match • Fruit Fly Ranch Activity.pdf – requires live specimens of fruit flies <p>Supplemental Reading:</p> <ul style="list-style-type: none"> • Relationship of Body Lice and Head Lice.pdf • Textbook: p 199 (chromosomes)
<p>3 The student uses critical thinking, scientific reasoning, and problem solving to make informed decisions and knows the contributions of relevant scientists.</p> <p>3D relate the impact of research on scientific thought and society, including the history of science and contributions of scientists as related to the content</p>	<p style="color: red;">Important scientists:</p> <ul style="list-style-type: none"> • Gregor Mendel 	