Anoka-Hennepin Secondary Curriculum Unit Plan

Department:	Science	Course:	Science 7 (Life Science)	Unit 4 Title:	Genetics	Grade Level(s):	7th Grade
Assessed Trimester:	Trimester 2	Pacing:	15-20 Days	Date Created:		Last Revision Date:	6.24.14

Course Understandings: *Students will understand that:*
- Patterns can be discerned in our natural world and can be used to make predictions.

DESIRED RESULTS (Stage 1) - WHAT WE WANT STUDENT TO KNOW AND BE ABLE TO DO?

Established Goals

- **Standard:** Reproduction is a characteristic of all organisms and is essential for the continuation of a species. Hereditary information is contained in genes which are inherited through asexual or sexual reproduction.
  Benchmark:
  7.4.3.1.1: Recognize that cells contain genes and that each gene carries a single unit of information that either alone, or with other genes, determines the inherited traits of an organism.
  7.4.3.1.2: Recognize that in asexually reproducing organisms all the genes come from a single parent, and that in sexually reproducing organisms half of the genes come from each parent.
  7.4.3.1.3: Distinguish between characteristics of organisms that are inherited and those acquired through environmental influences.

- **Standard:** Human Interactions with Living Systems
  Human activity can change living organisms and ecosystems.
  Benchmark:
  7.4.4.1.1 Describe examples where selective breeding has resulted in new varieties of cultivated plants and particular traits in domesticated animals.

- **Standard:** Science Literacy
  Reading Benchmark:
  Key ideas and details
  6.13.1.1: Cite specific textual evidence to support analysis of science and technical texts.
  6.13.2.2: Determine the central ideas or conclusions of a text; provide an accurate summary of the text distinct from prior knowledge or opinions
  6.13.3.3: Follow precisely a multistep procedure when carrying out experiments, designing solutions, taking measurements, or performing technical tasks.
  Craft and structure
  6.13.4.4: Determine the meaning of symbols, equations, graphical representations, tabular representations, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to *grades 6–8 texts and topics*.
  6.13.5.5: Analyze the structure an author uses to organize a text, including how the major sections contribute to the whole and to an understanding of the topic.
  Integration of knowledge and ideas
  6.13.9.9: Compare and contrast the information gained from experiments, simulations, video, or multimedia sources with that gained from reading a text on the same topic.
  Range of reading and level of text complexity
  6.13.10.10: By the end of grade 8, read and comprehend science/technical texts in the grades 6–8 text complexity band independently and proficiently.
  Writing Benchmark:
  Text types and purposes
  6.14.1.1: Write arguments focused on *discipline-specific content*.
  a. Introduce claim(s) about a topic or issue, acknowledge and distinguish the claim(s) from alternate or opposing claims, and organize the reasons and evidence logically.
  b. Support claim(s) with logical reasoning and relevant, accurate data and credible evidence that demonstrate an understanding of the topic or text, using credible sources.
  c. Use words, phrases, and clauses to create cohesion and clarify the relationships among claim(s), counterclaims, reasons, and evidence.
  d. Establish and maintain a formal style.
  Provide a concluding statement or section that follows from and supports the argument presented.
  Research to build and present knowledge
  6.14.9.9: Draw evidence from literary or informational texts to support analysis, reflection, and research.
  Range of writing

6.14.10.10: Write routinely over extended time frames (time for reflection and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences.

Transfer

Students will be able to independently use their learning to: (product, high order reasoning)

- To understand that the traits of organisms are inherited in predictable patterns. 7.4.3.1.1
- To understand that the environment can affect how genetic information is expressed. 7.4.3.1.3
- To understand that half of an organisms genetic information comes from each parent. 7.4.3.1.2
- To understand the language of science allows us to communicate effectively and efficiently.

Meaning

Unit Understanding(s):

Students will understand that:

- Characteristics of an organism are determined by heredity and environment. 7.4.3.1.3
- Inherit traits from parents through sexual and asexual reproduction. 7.4.3.1.2
- Interactions offspring have with the environment can affect inherited traits. 7.4.3.1.3
- The principles of probability apply to inheritance patterns. 7.4.3.1.1
- Human traits show a variety of phenotypes. 7.4.3.1.1

Essential Question(s):

Students will keep considering:

- Why do I look like (or different from) other members of my family?
- How can I look more like a grandparent or uncle/aunt than my parents?
- How can scientist predict what color a package of seeds will be (when that flower can be many different colors)?

Acquisition

Knowledge - Students will:

- Know that each gene carries a single unit of information. 7.4.3.1.1
- Know that one or more genes determine inherited traits. 7.4.3.1.1
- Know that in asexually reproducing organisms, all of the genes come from one parent. 7.4.3.1.2
- Know that in sexually reproducing organisms, half of the genes come from each parent. 7.4.3.1.2
- Sex cells contain half of the total genetic information. 7.4.3.1.2
- Identify environmental influences. 7.4.3.1.3
- Some inherited traits can be affected by the environment *(mutations caused by pollution can affect organism height, leaf number and leaf color).* 7.4.3.1.3
- Describe examples where selective breeding has result

Reasoning - Students will:

- Interpret the inherited traits of an organism. 7.4.3.1.1
- Distinguish between an inherited and an acquired trait. 7.4.3.1.3

Skills - Students will:

- Use a Punnett Square to predict the expected traits of an offspring. 7.4.3.1.1

Common Misunderstandings

- Sexual reproduction occurs in animals but not in plants.
- Students do not distinguish between sexual and asexual reproduction.
- Students do not understand the relationship between DNA, genes, and chromosomes.
- Students can apply chance and probability to assigned genetics problems, but not to human situations in families.
- Daughters inherit most of their characteristics from their mothers. Boys inherit most of their characteristics from their fathers.
- Genetic information exists in the body part it controls but not in other places in the body.
- Each parent contributes genetic information for certain characteristics and not others.
- In sexually reproducing organisms, genetic information or traits are inherited from only one parent.
- Any animal can be bred with any other animal.

Essential new vocabulary

- Genes
- Genetics
- Sexual Reproduction
- Asexual Reproduction
- Inherited Traits
- Acquired Traits
- Heredity
- Punnett Square
- Chromosome
- Phenotype
- Genotype
- Dominant
- Recessive
- Genetics
- DNA
- Sex Cells
- Mutation
- Instinctive Characteristics
- Learned Characteristics
- Selective Breeding