Subject: Science Grade: 7 Unit #: 3 Title: Genetics

UNIT OVERVIEW

<table>
<tr><th colspan="4">STAGE ONE: Identify Desired Results</th></tr>
<tr><td rowspan="6">Established Goals/Standards

1.1a Living things are composed of cells. Cells provide structure and carry on major functions to sustain life. Cells are usually microscopic in size.
1.1b The way in which cells function is similar in all living things. Cells grow and divide, producing more cells. Cells take in nutrients, which they use to provide energy for the work that cells do and to make the materials that a cell or an organism needs.
1.1c Most cells have cell membranes, genetic material, and cytoplasm. Some cells have a cell wall and/or chloroplasts. Many cells have a nucleus.
1.1d Some organisms are single cells; others, including humans, are multicellular.
4.1a Some organisms reproduce asexually. Other organisms reproduce sexually. Some organisms can reproduce both sexually and asexually.
4.1b There are many methods of asexual reproduction, including division of a cell into two cells, or separation of part of an animal or plant from the parent, resulting in the growth of another individual.
4.1c Methods of sexual reproduction depend upon the species. All methods involve the merging of sex cells to begin the</td><td colspan="3">Long-Term Transfer Goal
At the end of this unit, students will use what they have learned to independently…

Students will understand that genetic information is passed from generation to generation and physical appearance is determined by the combination of genes from each parent demonstrated by a case study where students will predict, investigate, and then provide evidence for Desiree’s baby.</td></tr>
<tr><td colspan="3">Meaning</td></tr>
<tr><td>Enduring Understandings
Students will understand that…

Cells are the basic structure and function of life.

Organisms reproduce sexually to provide variation within a species.

Genetic information is passed from generation to generation.</td><td colspan="2">Essential Questions
Students will consider such questions as…

Why don’t all living things look the same?</td></tr>
<tr><td colspan="3">Acquisition</td></tr>
<tr><td>What knowledge will students learn as part of this unit?

● Identify and correctly use key terms- sexual reproduction, asexual reproduction, genetics, DNA, egg, sperm, fertilization, heredity, nucleus, gene, chromosome, dominant, recessive, trait, cancer, sickle cell anemia, Punnett square, cladogram, ancestor, species, evolve, variation, trait, mutation, extinction, adaption, offspring, natural selection, predator, prey, cell membrane, cytoplasm, cell wall, chloroplast
● Living things are composed of 1 or more cells. Cells provide structure and have organelles that carry on major functions to sustain life.
● Compare and contrast sexual and asexual reproduction.
● How genetic traits are passed on from generation to generation.</td><td colspan="2">What skills will students learn as part of this unit?

● Read non-fictional text for information while employing reading strategies.
● Scientific skills (asking questions, gathering and analyzing data, making predictions, drawing conclusions based on evidence)
● Using microscopes to identify plant and animal cells
● Construct and interpret Punnett Squares
● Predict the probability of the inheritance of specific traits
● Predict the survival of different organisms/species based on environmental and genetic factors</td></tr>
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development of a new individual. In many species, including plants and humans, eggs and sperm are produced. 4.2a The male sex cell is the sperm. The female sex cell is the egg. The fertilization of an egg by a sperm results in a fertilized egg. 4.2b In sexual reproduction, sperm and egg each carry one-half of the genetic information for the new individual. Therefore, the fertilized egg contains genetic information from each parent. 4.3a Multicellular organisms exhibit complex changes in development, which begin after fertilization. The fertilized egg undergoes numerous cellular divisions that will result in a multicellular organism, with each cell having identical genetic information. 4.4a In multicellular organisms, cell division is responsible for growth, maintenance, and repair. In some one-celled organisms, cell division is a method of asexual reproduction. 4.4d Cancers are a result of abnormal cell division. 2.1a Hereditary information is contained in genes. Genes are composed of DNA that makes up the chromosomes of cells. 2.1c Each human cell contains a copy of all the genes needed to produce a human being. 2.1d In asexual reproduction, all the genes come from a single parent. Asexually produced offspring are genetically identical to the parent.	● Changes in environmental conditions can affect the survival of individual organisms with a particular trait. ● Human activities such as selective breeding and advances in genetic engineering may affect the variations of species.	

2.1e In sexual reproduction typically half of the genes come from each parent. Sexually produced offspring are not identical to either parent. 2.2a In all organisms, genetic traits are passed on from generation to generation. 2.2b Some genes are dominant and some are recessive. Some traits are inherited by mechanisms other than dominance and recessiveness. 2.2c The probability of traits being expressed can be determined using models of genetic inheritance. Some models of prediction are pedigree charts and Punnett squares.		

STAGE TWO: Determine Acceptable Evidence	
	Assessment Evidence
Criteria to assess understanding: *(This is used to build the scoring tool.)* ● Students will be able to explain how organisms reproduce sexually to provide variation within a species and how genetic information is passed from generation to generation through a rubric driven case study in which two parents with white skin have a baby	Performance Task focused on Transfer: Case study in which two parents with white skin have a baby with dark skin. Students will predict, investigate, and provide genetic evidence as to why the baby had a different phenotype than the parents.
	Other Assessment Evidence: Cell brochure compare and contrasting plant and animal cells, identifying cell organelles and their functions Punnett Squares Sexual vs. Asexual reproduction Summary responses: claim with evidence (5 week assessment rubric) Chalk Talk

with dark skin. Students will predict, investigate, and provide genetic evidence as to why the baby had a different phenotype than the parents. ● Living things are composed of cells ● Cells are made of organelles each with a specific function ● Organisms are multicellular or unicellular ● Two types of reproduction (Asexual and Sexual) ● Sex cells carry ½ genetic information ● Cell division is for growth and repair ● Cancer = abnormal cell division ● cell-nucleus-chromosome-DNA-gene ● Genes are passed from generation to generation ● Dominant vs. recessive traits ● Models to express probability of passing traits	

T, M, A *(Code for Transfer, Meaning Making and Acquisition)*	**STAGE THREE: Plan Learning Experiences**	
	Learning Events:	Evidence of learning: *(formative assessment)*
A	<u>Lesson 1:</u> Introduction to cells, unicellular and multicellular, cell theory through video and reading (pre, during, post reading strategies) *Introduce new essential question "Why don't all living things look the same?"	Bellwork Ticket out the door Graphic organizers Stop and think questions Reflect questions Assessment rubrics Whole group/small group discussions
A, M	<u>Lesson 2</u>: Getting to know your microscope and some practice using the scope (look at unicellular)	
M	<u>Lesson 3</u>: Microscopes with plant and animal cells (looking at similarities and differences)	
A, M	<u>Lesson 4</u>: Organelle (plant and animal) webquest or variation of webquest. Revisit lab when they looked at plant and animal cells	
A, M	<u>Lesson 5</u>: Plant and animal foldable *post exemplar on project board	
M, T	<u>Lesson 6</u>: Plant and animal cell stations in which students make claims about what type of cell it is and provide evidence	
T	<u>Lesson 7</u>: Half review half quiz	
A, M	<u>Lesson 8</u>: Human DNA extraction lab with a focus on the nucleus and what is inside of the nucleus. Note diagram from nucleus to DNA *Claim with evidence? Why don't all living things look the same?	
A, M	<u>Lesson 9</u>: Sexual reproduction vs. asexual reproduction reading, graphic organizer, advantages and disadvantages *Evidence based claim comparing the two types of reproduction	
A, M, T		

M M A, M M, T T M T	Lesson 10: Cell division (asexual reproduction), cancer with microscopes Lesson 11: Sexual reproduction comic strip, Sexual and Asexual reproduction evidence based questions *post exemplar on project board Lesson 12: Intro to genetics with smiley parents, genetics vocab with reading. Posters with vocabulary words, definitions, and pictures *post on project board Lesson 13: Punnett Square Intro and practice Lesson 14: Punnett Square practice on chromebooks *Example of punnett square on project board Lesson 15: Desiree's Baby Punnett Square activity Lesson 16: Review Lesson 17: Test	