Storyline Unit Design

Understanding by Design (UbD) Template*

Unit		Course(s)	
Designed by		Time Frame	

Anchor Model
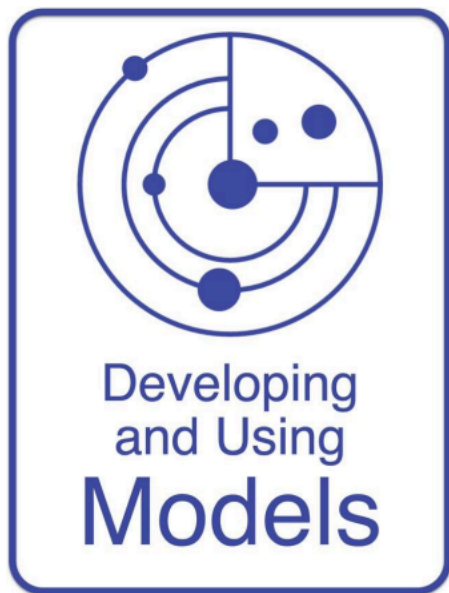
Stage 1: Desired Results

Performance Expectations

MS-LS3-1: Mutations - Harmful, Beneficial or Neutral
Develop and use a model to describe why structural changes to genes (mutations) located on chromosomes may affect proteins and may result in harmful, beneficial, or neutral effects to the structure and function of the organism.

MS-LS3-2: Asexual and Sexual Reproduction
Develop and use a model to describe why asexual reproduction results in offspring with identical genetic information and sexual reproduction results in offspring with genetic variation. (Cause and Effect)

Anchoring Phenomenon

Anchoring Phenomenon Worksheet

Enduring Understandings	Essential Questions

Stage 2: Assessments

MS-LS3-1: Hairless Xolos
MS-LS3-2: The Honeycrisp Apple

Assessment Screening Tools

Backward Design Elements

What new skills (practices) will students need to learn?	What thinking concepts will students need to learn?	What science concepts will students need to learn?
Obtaining, Evaluating, and Communicating Information Constructing Explanations Developing and Using Models Analyzing and Interpreting Data Engaging in Argument from Evidence	Cause & Effect Structure & Function Patterns System & System Models	Vocabulary Genes, Punnett Squares, Traits, Chromosomes, Protein Beneficial, Neutral, and Harmful Traits

Stage 3: Learning Plan

Phenomenon or Problem	Learning Performance - What will they do? The three dimensions woven together into a single learning performance.	Why is this important? How does this activity help build understanding of the anchoring phenomenon.	Learning Experience - How will they do it? Graphic organizers, protocols, scaffolds, labs, mini-lesson, student discourse, etc.
Formative Assessment - What information are you collecting to know that they met the target?			
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<u>Summative Assessment</u> What information are you collecting to know that they met the target?			
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Summative Assessment What information are you collecting to know that they met the target?			

Materials / Resources

Vocabulary

MS-LS3-1
Chromosomes
Genes
Proteins
Traits of organisms
Mutations
   - Harmful
   - Beneficial
   - Neutral
Structure and function

MS-LS3-2
Reproduction
   - Asexual
   - Sexual
Parent
Offspring
Chromosome
Gene
Gene transmission
Genetic variation
Cause and Effect

Mini Lessons
Causation Level 4 - Cause, Mechanism & Effect Mini-Lesson
Causation Level 4 Thinking Slides - Cause, Mechanism & Effect Thinking Slides

Graphic Organizers
Phenomena Observation Graphic Organizer
Questioning Graphic Organizer
Modeling Graphic Organizer
Planning an Investigation Organizer - Experimental
Planning an Investigation Organizer - Observational
Investigation Evidence Organizer
Engaging in Argumentation Organizer

Differentiation / Modifications

Phenomenon Worksheet

◁ **MS-PS3-1 - Mutations - Harmful, Beneficial or Neutral**
◁ **MS-LS3-2 - Asexual and Sexual Reproduction**
◁ **Local**
◁ **Favorite**
◁
◁
◁

Hemingway's Polydactyl Cats ◁
The Human Genome Project ◁◁
Mendel and the peas ◁
Punnett squares ◁
Apple varieties (Honeycrisp, Cosmic crisp, etc.) ◁
Malaria and Sickle Cell Anemia ◁
The Potential and Ethics of CRISPR ◁
Whiptail lizards ◁
Hairless dogs ◁◁
HIV protection from the plague ◁
Dolly the sheep ◁
Golden rices ◁
Epigenetics ◁◁
Zebrafish embryos
Calico cat ◁
Genetic engineering ◁
BT corn ◁
Dog breeding ◁
Silk in goat milk ◁
Mutations ◁
Dominant vs recessive genes ◁
1950's thalidomide babies
Variation in traits ◁
Tadpole development ◁
Kentucky Blue People ◁◁
Varied skin color in twins ◁
Color Blindness ◁
Sickle-cell anemia ◁
PTC paper ◁

MS-LS3-1: Mutations - Harmful, Beneficial or Neutral
Evidence Statement
Assessment: Hairless Xolos (PDF) (Google Template)

	No	Partial	Yes
Reflections: *I like that the assessments are 2-3 questions.* *The punnett square percentage descriptions were switched and made the question confusing. Question 3 should be more explicit in asking about if the mutation is beneficial in order to fully meet the standard. I liked how students are asked to use their knowledge to answer the questions with new information instead of just copying down things memorized or talked about in class.*			
1. The assessment contains a **phenomenon** (science) or a **problem** (engineering)			x
2. The **prompts** match the Science and Engineering Practice (SEP) and engage students in sense making.			x
3. The **stimuli** have multiple and sufficient information needed to utilize the SEP. (e.g. multiple data sets to analyze)			x
4. The **prompts** elicit observable understanding of the Disciplinary Core Idea (DCI).		x	
5. The **prompts** explicitly mention the Crosscutting Concept (CCC).			x
6. The **prompts** include language (i.e. bullets) from grade appropriate progressions. (SEP)(DCI)(CCC)			x
7. The **graphic organizers** provide space for the observable features (e.g. 1, 2, 3...) in the evidence statement. (e.g. claim, evidence and reasoning)			x
8. The **entire assessment** contains information that is scientifically accurate and properly attributed. (e.g. don't make up data and include the source)			x
9. The **prompts** point in the direction of explaining a phenomenon (science) or designing a solution (engineering).			x
10. The **phenomenon** or **problem** is authentic, interesting, and requires students to figure something out.	x		
11. The **phenomenon** or **problem** is novel to show the transfer of knowledge. (i.e. not in the unit)			x

Screening Tools

MS-LS3-2: Asexual and Sexual Reproduction
Evidence Statement
Assessment: Coaster Launch (PDF) (Google Template)

Reflections:	No	Partial	Yes
1. The assessment contains a **phenomenon** (science) or a **problem** (engineering)			
2. The **prompts** match the Science and Engineering Practice (SEP) and engage students in sense making.			
3. The **stimuli** have multiple and sufficient information needed to utilize the SEP. (e.g. multiple data sets to analyze)			
4. The **prompts** elicit observable understanding of the Disciplinary Core Idea (DCI).			
5. The **prompts** explicitly mention the Crosscutting Concept (CCC).			
6. The **prompts** include language (i.e. bullets) from grade appropriate progressions. (SEP)(DCI)(CCC)			
7. The **graphic organizers** provide space for the observable features (e.g. 1, 2, 3...) in the evidence statement. (e.g. claim, evidence and reasoning)			
8. The **entire assessment** contains information that is scientifically accurate and properly attributed. (e.g. don't make up data and include the source)			
9. The **prompts** point in the direction of explaining a phenomenon (science) or designing a solution (engineering).			
10. The **phenomenon** or **problem** is authentic, interesting, and requires students to figure something out.			
11. The **phenomenon** or **problem** is novel to show the transfer of knowledge. (i.e. not in the unit)			