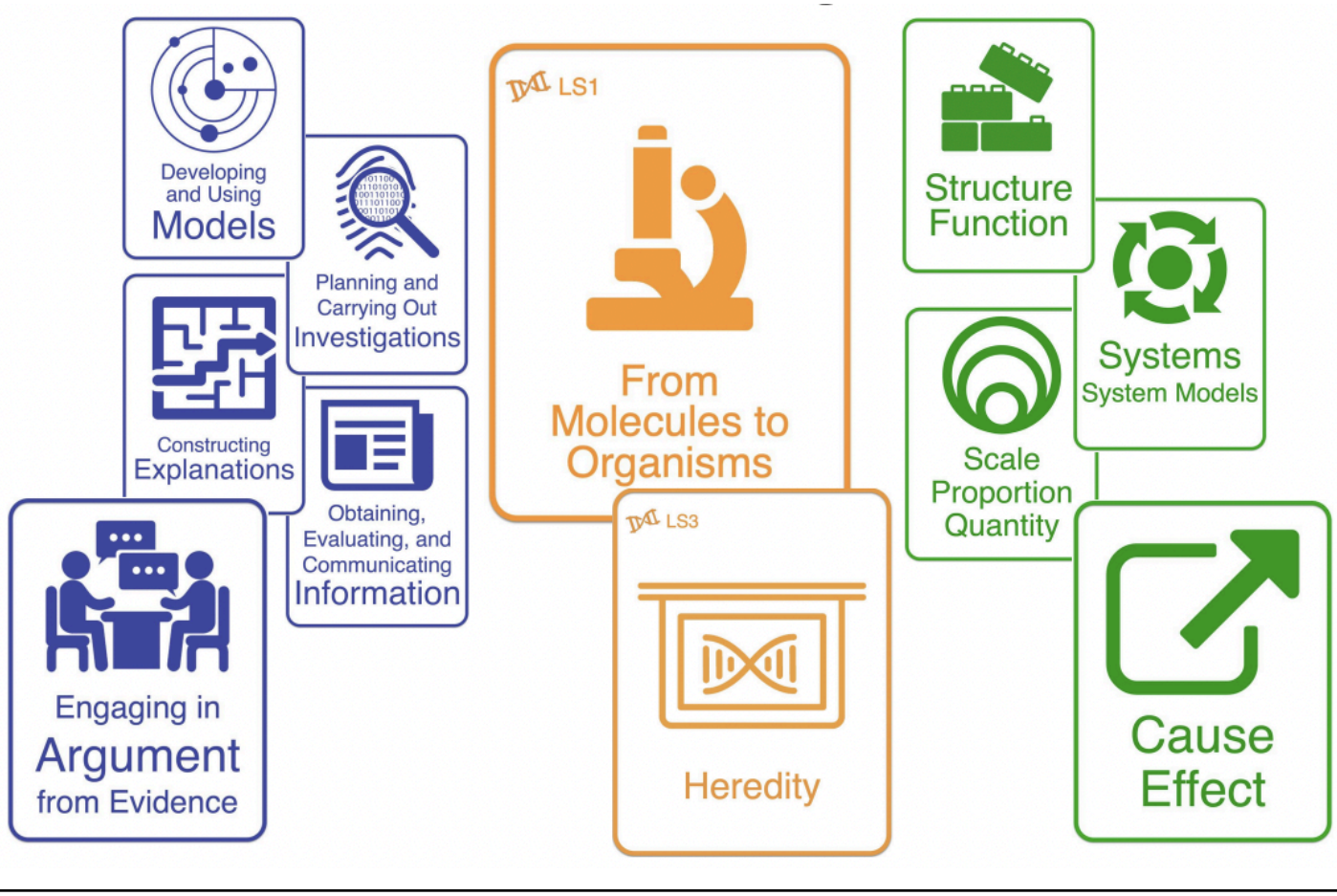
Storyline Unit Design

Understanding by Design (UbD) Template*

Unit		Course(s)	
Designed by	**Valley Central 8th Grade Science Teachers**	Time Frame	

Anchor Model



*UbD Unit Planner is from Wiggins, Grant and McTighe, Jay. Understanding by Design Guide to Creating High-Quality Units. Alexandria, VA: Association for Supervision and Curriculum Development. 2011.

Stage 1: Desired Results

Performance Expectations

MS-LS1-1: Cell Theory
Conduct an investigation to provide evidence that living things are made of cells; either one cell or many different numbers and types of cells. (Scale, Proportion, and Quantity)

MS-LS1-2: Cell Parts and Function
Develop and use a model to describe the function of a cell as a whole and ways parts of cells contribute to the function. (Structure and Function)

MS-LS1-3: Interacting Body Systems
Use argument supported by evidence for how the body is a system of interacting subsystems composed of groups of cells. (Systems and System Models)

MS-LS1-4: Animal Behaviors and Plant Structures - Reproductive Success
Use argument based on empirical evidence and scientific reasoning to support an explanation for how characteristic animal behaviors and specialized plant structures affect the probability of successful reproduction of animals and plants respectively. (Cause and Effect)

MS-LS1-5: Environmental and Genetic Growth Factors
Construct a scientific explanation based on evidence for how environmental and genetic factors influence the growth of organisms. (Cause and Effect)

MS-LS1-8: Information Processing
Gather and synthesize information that sensory receptors respond to stimuli by sending messages to the brain for immediate behavior or storage as memories. (Cause and Effect)

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

Type Here	*Type Here*

Stage 2: Assessments

MS-LS1-1	Pond Water Popsicles	Assessment	Key	Evidence Statement
MS-LS1-2	The Pool Has Ruined the Grass (v2)	Assessment	Key	Evidence Statement
MS-LS1-3	A Walk Around Bozeman	Assessment	Key	Evidence Statement
MS-LS1-4	The Gulls of Appledore Island	Assessment	Key	Evidence Statement
MS-LS1-5	The Future Fish Farmers of Malawi	Assessment	Key	Evidence Statement
MS-LS1-8	What Do You Hear?	Assessment	Key	Evidence Statement
MS-LS3-2	The Honeycrisp Apple	Assessment	Key	Evidence Statement

Assessment Screening Tool Slides

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?
• Conduct an investigation • Create a model (punnett square) of asexual and sexual • Use oral and written arguments • Use a microscope • Prepare a slide • Reading and interpreting graphs	• There are multiple levels of systems that allow organisms to survive • Scale and Proportion • Cause and effect - your senses convert stimuli to electrical impulses for the brain to interpret • Cause and effect - many effects may have multiple causes • Cause-and-effect relationships between: 1. Specialized plant structures and the probability of successful reproduction of plants that have those structures. 2. Animal behaviors and the probability of successful reproduction of animals that exhibit those behaviors. 3.	• All living things are made of cells. • Asexual and Sexual • Genes are passed on • The genes are located on chromosomes, the chromosome that is passed on determines inheritance • Structure and function of a cell • Bodies communicate with electromagnetic, chemical, and mechanical methods • Levels of organization in the human body • Body Systems and Interactions • Characteristics are determined by genes and the environment

	Plant reproduction and the animal behaviors related to plant reproduction.	• Behaviors of animals improve their chances of reproduction Plants have specialized structures and strategies to help them reproduce

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.
Breeding a new Apple	Students will ask questions about patterns of inheritance	Engage students in anchoring phenomena	Brainstorm questions Look for similarities in questions, wonderwall
Formative Assessment - What information are you collecting to know that they met the target?			
Genes and the environment Factors that affect the growth of apple trees	Students will examine the cause and effect relationship between genes and environmental factors. Fertilizer, temperature, sunlight, water effects on plant growth	Cause and effect - many effects have many causes	Analyze data Construct Explanations
Formative Assessment - What information are you collecting to know that they met the target?			
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Materials / Resources

Vocabulary

MS-LS1-1
Nonliving things
Living things
- Unicellular
- Multicellular

Cells
Cell types
Scale

MS-LS1-2
Plant cells
Animal cells
Cell parts (structures)
- Nucleus
- Chloroplast
- Mitochondria
- Cell membrane
- Cell wall

Cell function

MS-LS1-3
Body
Body systems
- Circulatory
- Excretory
- Digestive,
- Respiratory
- Muscular
- Nervous

Interaction
Organs
Tissues
Cells

MS-LS1-4
Animal behaviors (e.g. nest building, protecting young from predators)
Animal structures (e.g. colorful plumage in birds)
Plant structures (e.g. flowers, nectar, hard shells on nuts)
Reproductive success
Cause and Effect

MS-LS1-5
Environmental factors (e.g. food, light, space, and water)
Genetic factors (e.g. specific breeds of plants & animals and their typical sizes)
Growth of organisms
Cause and Effect

MS-LS1-8
Sensory receptors
Stimuli (e.g. electromagnetic, mechanical, chemical)
Brain
Nerves
Nerve signals
Processing
Behavior
Memories
Cause and Effect

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 - Cause, Mechanism & Effect Thinking Slides
Causation Level 5 - Probability and Prediction Mini-Lesson
Causation Level 5 - Probability and Prediction Thinking Slides
Systems Level 4 - Hierarchy of Systems Mini Lesson
Systems Level 4 - Hierarchy of Systems Thinking Slides
Scale Level 3 - Scale and Perspective

Scale Level 3 - Scale and Perspective Thinking Slides
Structure & Function Level 4 - Structures at Varying Scale
Structure & Function Level 4 - Structures at Varying Scale 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

Back to Stage 1

◁ **MS-LS1-1 - Cell Theory**
◁ **MS-LS1-2 - Cell Parts and Function**
◁ **MS-LS1-3 - Interacting Body Systems**
◁ **MS-LS1-8 - Information Processing**

◁**MS-LS1-4 - Animal Behavior and Plant Structures - Reproductive Success**
◁ **MS-LS1-5 - Environmental and Genetic Growth Factors**
◁ **MS-LS3-2 - Sexual and Asexual Reproduction**
◁ **Local & Relevant**
◁ **Favorite**

Farming ◁ ◁
Fertilizer ◁
Grafting - Apples ◁◁
Incubation temperature determining gender of turtles ◁
Pollination - insect/animal versus wind ◁◁
Selective Breeding ◁
Effects of lead on human development ◁ ◁
Diet and development - vitamin deficiencies etc
Animal behavior for reproduction - bird songs, blue footed booby,

Screening Tools

Back to Stage 2

MS-LS1-1: Cell Theory

Evidence Statement

Pond Water Popsicles (Google Template) (Google Key)

Reflections: *Type Here*

	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)			

MS-LS1-2: Cell Parts and Function

Evidence Statement

Assessment: The Pool Has Ruined the Grass (v2) (Google Template) (Google Key)

Reflections: *Type Here*

	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.			
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Screening Tools

Back to Stage 2

MS-LS1-3: Interacting Body Systems

Evidence Statement

A Walk Around Bozeman (Google Template) (Google Key)

Reflections: *Type Here*

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Screening Tools

Back to Stage 2

MS-LS1-4: Animal Behaviors and Plant Structures - Reproductive Success

Evidence Statement

Assessment: The Gulls of Appledore Island (Google Template) (Google Key)

Reflections: *Type Here*

	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.			
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Screening Tools

Back to Stage 2

MS-LS1-5

Evidence Statement

The Future Fish Farmers of Malawi (Google Template) (Google Key)

Reflections: *Type Here*

	No	Partial	Yes
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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)			
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Screening Tools

Back to Stage 2

MS-LS1-8: Information Processing

Evidence Statement

What Do You Hear? (Google Template) (Google Key)

Reflections: *Type Here*

	No	Partial	Yes
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Screening Tools

Back to Stage 2

MS-LS3-2: Sexual and Asexual Reproduction

Evidence Statement

Assessment: The Honeycrisp Apple (Google Template) (Key Template)

Reflections: *Type Here*

	No	Partial	Yes
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