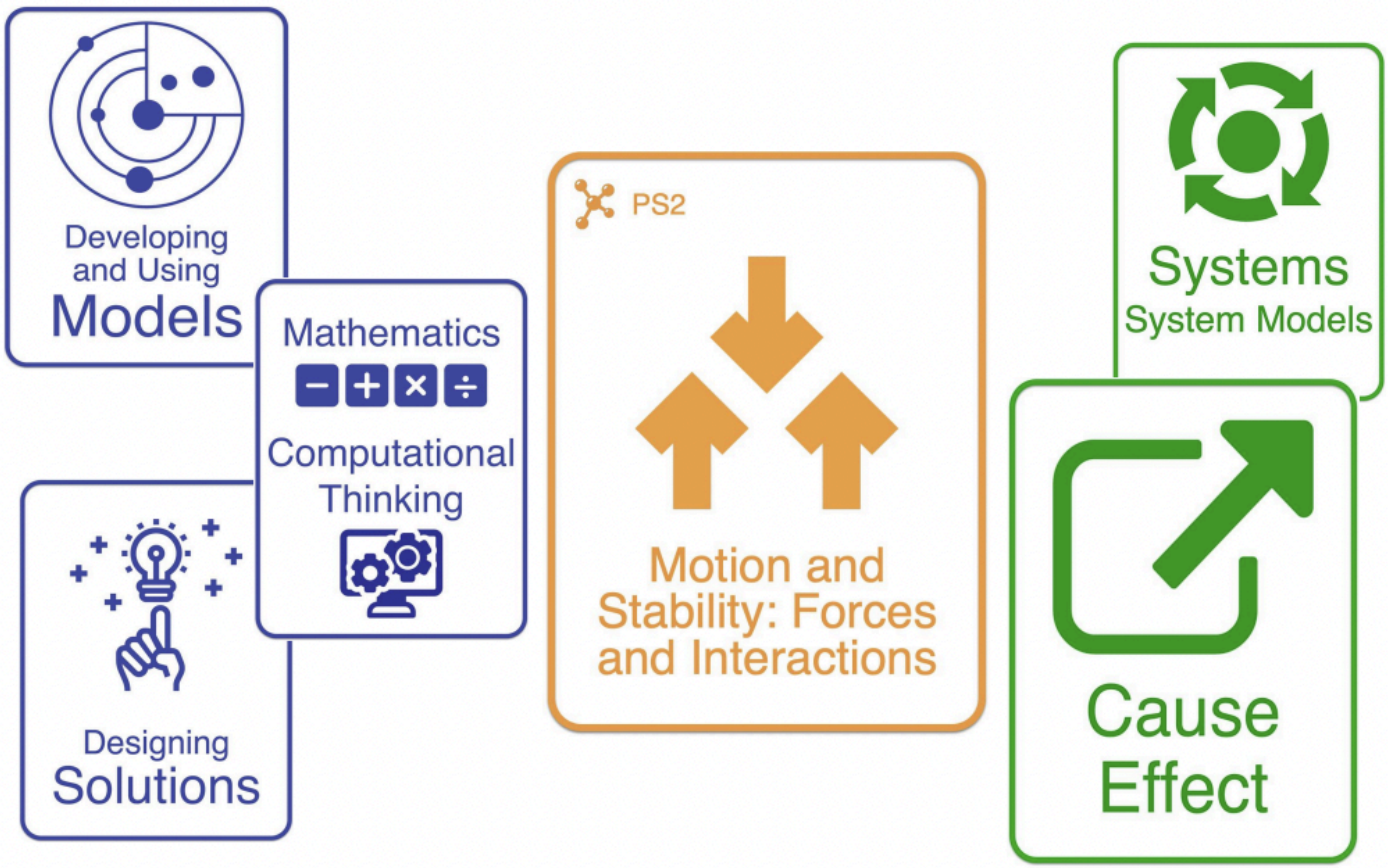
Storyline Unit Design

Understanding by Design (UbD) Template*

Unit		Course(s)	
Designed by		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

HS-PS2-1: Newton's Second Law of Motion
Analyze data to support the claim that Newton's second law of motion describes the mathematical relationship among the net force on a macroscopic object, its mass, and its acceleration. (Cause and Effect)

HS-PS2-2: Conservation of Momentum
Use mathematical representations to support the claim that the total momentum of a system of objects is conserved when there is no net force on the system. (Systems and System Models)

HS-PS2-3: Reducing Force in Collisions Device
Apply scientific and engineering ideas to design, evaluate, and refine a device that minimizes the force on a macroscopic object during a collision. (Cause and Effect)

Anchoring Phenomenon

Anchoring Phenomenon Worksheet

Enduring Understandings	Essential Questions

Stage 2: Assessments

HS-PS2-1 - The Gyro Drop
HS-PS2-2 - Space Balls
HS-PS2-3 - Designing a Phone Protector

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?

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.
Cyclop Sheep	Students will ask questions about the cause of a mutation caused developmental disease in an organism.	Asking questions is how inquiry starts. Cause and effect to identify cause throughout unit Start at organism level is more exciting that starting at DNA level	Photo of cyclop sheep Driving question from Assess students on what makes a good scientific question Mini lesson on cause mechanism effect
Formative Assessment - What information are you collecting to know that they met the target?		Give students feedback on their ability to ask a scientific question.	
Cyclop Sheep	Students will model the system or structure & function . . . Students will analyze patterns of data . . . Students will obtain information about their ecosystem . . .		
Formative Assessment - What information are you collecting to know that they met the target?			
PTC tasting	Students will investigate . . .		
Formative Assessment - What information are you collecting to know that they met the target?		Update their cyclop sheep model	
Formative Assessment - What information are you collecting to know that they met the target?			

<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

HS-PS2-1
Newton's law of motion
Macroscopic object
Net force
Mass
Acceleration
Cause and Effect

HS-PS2-2
Momentum
Mass
Velocity
Macroscopic bodies
Systems, Boundary, Objects
Interaction (collision or explosion)
Conservation of Momentum
(2 objects 1 dimension)

HS-PS2-3
Force
Collision
Momentum
Impulse
Macroscopic object
Design solution
Cause and Effect

Mini Lessons

Causation Level 4 - Cause, Mechanism & Effect Mini-Lesson
Causation Level 4 - Cause, Mechanism & Effect Thinking Slides
Causation Level 6 - Causation and Correlation
Causation Level 6 - Causation and Correlation Thinking Slides
Systems Level 6 - Boundary and Initial Conditions
Systems Level 6 - Boundary and Initial Conditions 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

◁ **HS-PS2-1 - Newton's Second Law of Motion**
◁ **HS-PS2-2 - Conservation of Momentum**
◁ **HS-PS2-3 - Reducing Force in Collisions Device**
◁ **Local**
◁ **Favorite**
◁
◁

Screening Tools

Back to Stage 2

HS-PS2-1: Newton's Second Law of Motion

Evidence Statement

Assessment: The Gyro Drop (PDF) (Google Template)

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)			

Screening Tools

Back to Stage 2

HS-PS2-2: Conservation of Momentum

Evidence Statement

Assessment: Space Balls (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).			
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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)			

Screening Tools

Back to Stage 2

HS-PS2-3: Reducing Forces in Collisions Device

Evidence Statement

Assessment: Designing a Phone Protector (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)			
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