

Storyline Unit Design

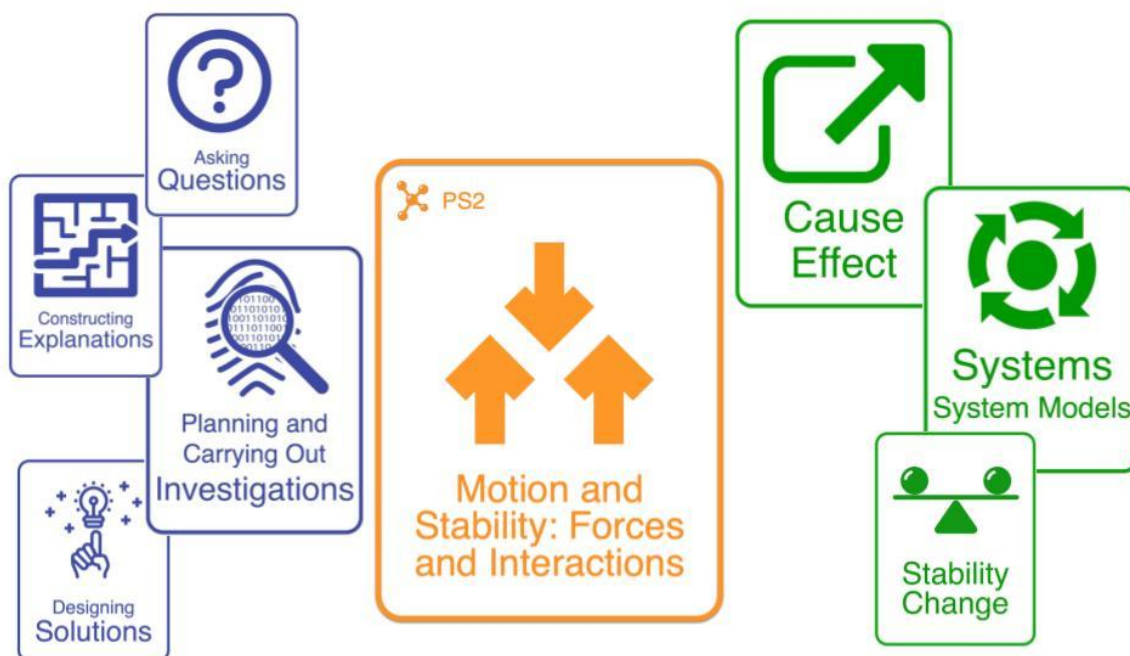
Understanding by Design (UbD) Template*

Unit		Course(s)	
Designed by		Time Frame	

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Anchor Model

Forces and Interactions



Stage 1: Desired Results

Performance Expectations

MS-PS2-1: Collision Design Solution

Apply Newton's Third Law to design a solution to a problem involving the motion of two colliding objects. (Systems and System Models)

MS-PS2-2: Forces, Mass and the Motion of an Object

Plan an investigation to provide evidence that the change in an object's motion depends on the sum of the forces on the object and the mass of the object. (Stability and Change)

MS-PS2-3: Electric and Magnetic Forces

Ask questions about data to determine the factors that affect the strength of electric and magnetic forces. (Cause & Effect)

MS-PS2-4: Gravitational Interactions

Construct and present arguments using evidence to support the claim that gravitational interactions are attractive and depend on the masses of interacting objects. (Systems and System Models)

MS-PS2-5: Electric, Magnetic, and Gravitational Fields

Conduct an investigation and evaluate the experimental design to provide evidence that fields exist between objects exerting forces on each other even though the objects are not in contact. (Cause and Effect)

Anchoring Phenomenon

[Anchoring Phenomenon Worksheet](#)

Enduring Understandings

Essential Questions

Stage 2: Assessments

MS-PS2-1 - [Designing Robot Fingers](#)

MS-PS2-2 - [Coaster Launcher](#)

MS-PS2-3 - [Improving a Homemade Speaker](#)

MS-PS2-4 - [Planetary Gravity](#)

MS-PS2-5 - [Viral Battery Video](#)

[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.
Phone Shattering	Students will define a problem to explain how the structure/function of a system involves the motion of two colliding objects.	The structure & design of the object may determine why and how it breaks	Design a device that would reduce the impact of forces on the phone/object.
Formative Assessment - What information are you collecting to know that they met the target?			
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Materials / Resources

Vocabulary

MS-PS2-1

Newton's Third Law
 Action force
 Reaction force
 Objects
 Collision
 Design solution
 Systems

MS-PS2-2

Forces
 - balanced (Newton's First Law)
 - unbalanced
 Mass
 Change in motion
 Object
 Frame of reference
 Stability and Change

MS-PS2-3

Electric force
 Magnetic force
 Attraction and repulsion
 Electric charge
 Electric current
 Magnet
 Devices (e.g. electromagnet, electric motor, generator)
 Cause and Effect

MS-PS2-4

Gravitational interactions
 Gravitational force
 Objects
 Mass
 Attraction
 Systems

MS-PS2-5

Electric field
 Magnetic field
 Gravitational field
 Forces (magnetic, electric, gravitational)
 Test object (e.g. magnet, charged pith ball, ball)
 Cause and Effect

Mini Lessons

Causation Level 4 - [Causation Level 4 - Cause, Mechanism & Effect Mini-Lesson](#)
 Causation Level 4 Thinking Slides - [Causation Level 4 - Cause, Mechanism & Effect Thinking Slides](#)
 System Level 3 - [System Level 3 - Inputs, Processes and Outputs Mini-Lesson](#)
 System Level 3 Thinking Slides - [System Level 3 - Inputs, Processes and Outputs 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

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