Storyline Unit Design

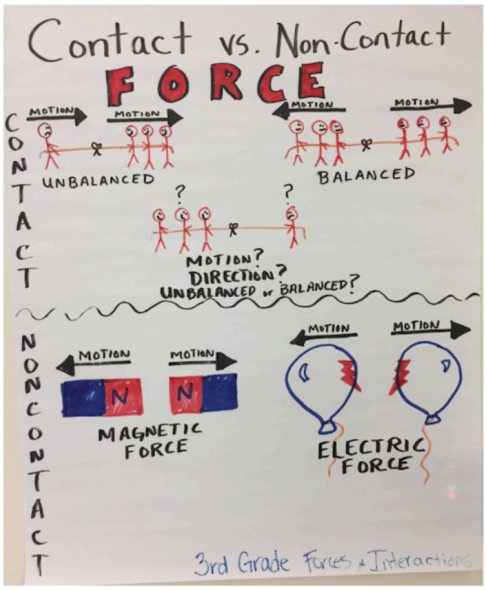
Understanding by Design (UbD) Template*

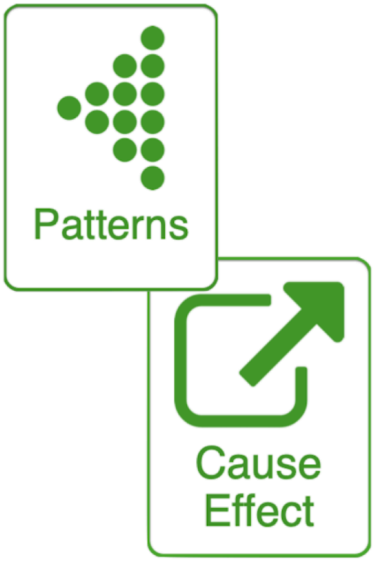
Unit		Course(s)	
Designed by		Time Frame	

Anchor Model

Forces and Interactions

Grade 3





*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

3-PS2-1: Balanced and Unbalanced Forces

Plan and conduct an investigation to provide evidence of the effects of balanced and unbalanced forces on the motion of an object. (Cause and Effect)

3-PS2-2: Predicting Future Motion

Make observations and/or measurements of an object's motion to provide evidence that a pattern can be used to predict future motion.

3-PS2-3: Electric and Magnetic Forces

Ask questions to determine cause and effect relationships of electric or magnetic interactions between two objects not in contact with each other.

3-PS2-4: Magnetic Design Solution

Define a simple design problem that can be solved by applying scientific ideas about magnets. (Engineering and Technology)

Anchoring Phenomenon

Anchoring Phenomenal Worksheet

Enduring Understandings	Essential Questions

Stage 2: Assessments

3-PS2-1 - Lego Cart Launch
3-PS2-2 - Ball Bounce Predictions
3-PS2-3 - Bubble Levitator
3-PS2-4 - Oil Spills Cleanup

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?

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?			
Formative Assessment - What information are you collecting to know that they met the target?			
Formative Assessment - What information are you collecting to know that they met the target?			
Formative Assessment - What information are you collecting to know that they met the target?			
Summative Assessment What information are you collecting to know that they met the target?			
Formative Assessment - What information are you collecting to know that they met the target?			
Formative Assessment - What information are you collecting to know that they met the target?			

Formative Assessment - What information are you collecting to know that they met the target?			
Formative Assessment - What information are you collecting to know that they met the target?			
Summative Assessment What information are you collecting to know that they met the target?			
Formative Assessment - What information are you collecting to know that they met the target?			
Formative Assessment - What information are you collecting to know that they met the target?			
Formative Assessment - What information are you collecting to know that they met the target?			
Formative Assessment - What information are you collecting to know that they met the target?			
Formative Assessment - What information are you collecting to know that they met the target?			
Summative Assessment What information are you collecting to know that they met the target?			

Formative Assessment - What information are you collecting to know that they met the target?			
Formative Assessment - What information are you collecting to know that they met the target?			
Formative Assessment - What information are you collecting to know that they met the target?			
Formative Assessment - What information are you collecting to know that they met the target?			
Summative Assessment What information are you collecting to know that they met the target?			

Materials / Resources

Vocabulary

3-PS2-1
Forces (e.g. number, size, direction)
- Balanced
- Unbalanced

Motion (e.g. starting, stopping, or changing direction)
Object
Cause and Effect

3-PS2-2
Patterns of motion (e.g. swinging pendulum, ball on curved track, magnet repulsion)
Future motion
Object

3-PS2-3
Non-contact force
- Electric force
- Magnetic force

Charged object (e.g. static electricity)
Magnet
Cause and Effect

3-PS2-4
Magnet
Magnetic force
Design solution

Mini Lessons
Patterns Level 2 - Patterns of Change Mini-Lesson
Patterns Level 2 Thinking Slides - Patterns of Change Thinking Slides
Causation Level 3 - Causal Relationships Mini-Lesson
Causation Level 3 Thinking Slides - Causal Relationships Thinking Slides

Graphic Organizers
3-PS2-1 - Balanced and Unbalanced Forces Graphic Organizers (Student Edition)
3-PS2-1 - Balanced and Unbalanced Forces Graphic Organizer (Teacher Edition)
3-PS2-2 - Predicting Future Motion Graphic Organizer (Student Edition)
3-PS2-2 - Predicting Future Motion Graphic Organizer (Teacher Edition)
3-PS2-3 - Magnetic and Electric Forces Graphic Organizer (Student Edition)
3-PS2-3 - Magnetic and Electric Forces Graphic Organizer (Teacher Edition)
3-PS2-4 - Magnetic Design Solution Graphic Organizer (Student Edition)
3-PS2-4 - Magnetic Design Solution (Teacher Edition)
Phenomena Observation Graphic Organizer
Questioning Graphic Organizer
Modeling Graphic Organizer
Planning an Investigation Organizer
Investigation Evidence Organizer
Engaging in Argumentation Organizer

Differentiation / Modifications

Phenomenon Worksheet

Back to Stage 1

◁ **3-PS2-1 Balanced and Unbalanced Forces**
◁ **3-PS2-2 Predicting Motion**
◁ **3-PS2-3 Electric and Magnetic Forces**
◁ **3-PS2-4 Magnetic Design Solution**
◁ **Local**
◁ **Favorite**
◁

3-PS2-1: Balanced and Unbalanced Forces

Evidence Statement

Assessment: Lego Cart Launch (PDF) (Google Template)

Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
Planning and Carrying Out Investigations Planning and carrying out investigations to answer questions or test solutions to problems in 3–5 builds on K–2 experiences and progresses to include investigations that control variables and provide evidence to support explanations or design solutions. • Plan and conduct an investigation collaboratively to produce data to serve as the basis for evidence, using fair tests in which variables are controlled and the number of trials considered. - ***Connections to Nature of Science*** **Scientific Investigations Use a Variety of Methods** • Science investigations use a variety of methods, tools, and techniques.	**PS2.A: Forces and Motion** • Each force acts on one particular object and has both strength and a direction. An object at rest typically has multiple forces acting on it, but they add to give zero net force on the object. Forces that do not sum to zero can cause changes in the object's speed or direction of motion. (Boundary: Qualitative and conceptual, but not quantitative addition of forces are used at this level.) **PS2.B: Types of Interactions** • Objects in contact exert forces on each other.	**Cause and Effect** • Cause and effect relationships are routinely identified.

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 **phenomenon** or **problem** is novel to show the transfer of knowledge. (i.e. not in the unit)			

3-PS2-2: Predicting Future Motion

Evidence Statement

Assessment: Ball Bounce Predictions (PDF) (Google Template)

Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
Planning and Carrying Out Investigations Planning and carrying out investigations to answer questions or test solutions to problems in 3–5 builds on K–2 experiences and progresses to include investigations that control variables and provide evidence to support explanations or design solutions. • Make observations and/or measurements to produce data to serve as the basis for evidence for an explanation of a phenomenon or test a design solution. ***Connections to Nature of Science*** **Science Knowledge is Based on Empirical Evidence** • Science findings are based on recognizing patterns.	**PS2.A: Forces and Motion** • The patterns of an object's motion in various situations can be observed and measured; when that past motion exhibits a regular pattern, future motion can be predicted from it. (Boundary: Technical terms, such as magnitude, velocity, momentum, and vector quantity, are not introduced at this level, but the concept that some quantities need both size and direction to be described is developed.)	**Patterns** • Patterns of change can be used to make predictions.

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 **phenomenon** or **problem** is novel to show the transfer of knowledge. (i.e. not in the unit)			

Screening Tools

Back to Stage 2

3-PS2-3: Electric and Magnetic Forces

Evidence Statement

Assessment: Bubble Levitator (PDF) (Google Template)

Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
Asking Questions and Defining Problems Asking questions and defining problems in grades 3–5 builds on grades K–2 experiences and progresses to specifying qualitative relationships. • Ask questions that can be investigated based on patterns such as cause and effect relationships.	**PS2.B: Types of Interactions** • Electric, and magnetic forces between a pair of objects do not require that the objects be in contact. The sizes of the forces in each situation depend on the properties of the objects and their distances apart and, for forces between two magnets, on their orientation relative to each other.	**Cause and Effect** • Cause and effect relationships are routinely identified, tested, and used to explain change.

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 **phenomenon** or **problem** is novel to show the transfer of knowledge. (i.e. not in the unit)			

Screening Tools

Back to Stage 2

3-PS2-4: Magnetic Design Solution

Evidence Statement

Assessment: Oil Spills Clean-Up (PDF) (Google Template)

Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
Asking Questions and Defining Problems Asking questions and defining problems in grades 3–5 builds on grades K–2 experiences and progresses to specifying qualitative relationships. • Define a simple problem that can be solved through the development of a new or improved object or tool.	**PS2.B: Types of Interactions** • Electric, and magnetic forces between a pair of objects do not require that the objects be in contact. The sizes of the forces in each situation depend on the properties of the objects and their distances apart and, for forces between two magnets, on their orientation relative to each other.	***Connections to Engineering, Technology, and Applications of Science*** **Interdependence of Science, Engineering, and Technology** • Scientific discoveries about the natural world can often lead to new and improved technologies, which are developed through the engineering design process.

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 **phenomenon** or **problem** is novel to show the transfer of knowledge. (i.e. not in the unit)			