Appendix

Science Fair Mystery Standards Matrix

The Science Fair Mystery is a 12-lesson program that helps learners meet the Next Generation Science Standards (NGSS) and the Common Core Learning Standards (CCLS).

Ideally suited for learners in grades 6-7, *The Science Fair Mystery* meets many of the practices, cross-cutting concepts, and disciplinary core ideas that comprise the Next Generation Science Standards. The practices, concepts, and disciplinary ideas specifically covered in this unit include:

PRACTICES:

Asking Questions and Defining Problems

- Ask questions that can be investigated within the scope of the classroom, outdoor environment, and museums and other public facilities with available resources, and, when appropriate, frame a hypothesis based on observations and scientific principles.

Planning and Carrying Out Investigations

- Make observations and measurements to produce data to serve as the basis for evidence for an explanation of a phenomenon.
- Plan an investigation individually and collaboratively, and in the design: identify independent and dependent variables and controls, what tools are needed to do the gathering, how measurements will be recorded, and how much data is needed to support a claim.
- Conduct an investigation to produce data to serve as the basis for evidence that can meet the goals of the investigation.

Analyzing and Interpreting Data

- Analyze and interpret data to determine similarities and differences in findings.

Engaging in Argument from Evidence

- Support an argument with evidence, data, or a model.

Obtaining, Evaluating, and Communicating Information

- Collect, analyze, discuss, and document evidence and clues

Scientific Knowledge is Based on Empirical Evidence

- Science knowledge is based upon logical and conceptual connections between evidence and explanations.
- Science disciplines share common rules of obtaining and evaluating empirical evidence.

CROSS-CUTTING CONCEPTS:

Patterns

- Graphs, charts, and images can be used to identify patterns in data.

DISCIPLINARY CORE IDEAS:

PS1.A: Structure and Properties of Matter

- Measurements of a variety of properties can be used to identify materials.

PS1.B: Chemical Reactions

- Chemical Reactions observed where some reactions release energy and others absorb energy.

PS2.A: Force and Motion

- Damage observed at the crime scene displays the effects of an object's relationship with force and motion.

PS2.B: Types of Interactions

- Damage observed at the crime scene displays the type of reaction between an object and a surface.

PS3.C: Relation Between Energy and Forces

- Damage observed at the crime scene displays the relation between energy and forces with a reactionary resul

COMMON CORE LEARNING STANDARDS

In addition to meeting the National Science Education Standards (NSES) and Next Generation Science Standards (NGSS), this unit meets Common Core Learning Standards (CCLS) in English Language Arts and Literacy. Specific CCLS addressed include:

CCSS.ELA-Literacy.RI.6.1 : Read the text and analyze the dialogue between characters to uncover clues. Use these clues to make inferences about what might have happened, supporting observations with textual evidence.

CCSS.ELA-Literacy.RI.6.2 : After reading the text, discuss the central ideas and dilemmas that arise within each lesson related to the mystery. This should be based on supporting evidence.

CCSS.ELA-Literacy.RI.6.3 : Discuss how the SFM characters interact with one another, and change as the mystery develops and new clues are discovered.

CCSS.ELA-Literacy.RI.6.7 : Review graphs, photos, text message conversations, and interview conversations to better understand the SFM.

CCSS.ELA-Literacy.RI.6.8 : Evaluate and analyze the evidence presented along with the accusations made by characters in the story during the second half of the SFM.

CCSS.ELA-Literacy.RL.6.3 : Observe how the characters change and identify who is considered a suspect as new evidence is uncovered.

CCSS.ELA-Literacy.RL.6.4 : Review the text and evaluate the possible meanings behind suspect statements, taking into consideration 'means, motive, and opportunity'.

CCSS.ELA-Literacy.RST.6-8.3 : Follow the structured steps listed in the lab directions to complete the lab successfully.

CCSS.ELA-Literacy.SL.6.1 : Participate in discussions during the 'wrap up' section in each lesson, including discussions with students and as a class with the instructor. Take into consideration other's opinions based on evidence.

CCSS.ELA-Literacy.SL.6.4 : Discuss your observations during the wrap up section at the end of each lesson, using evidence to support your findings and suspicions.

CCSS.ELA-Literacy.SL.6.6 : Demonstrate an understanding of appropriate voice command while questioning suspects and witnesses.

CCSS.ELA-Literacy.W.6.1 : Document your observations based on scientific reasoning and lab analysis after the lesson.

CCSS.ELA-Literacy.W.6.9 : Document your evidence on the 'Class Roster' worksheet based on your analysis from the text and lab exercises.

CCSS.MATH.Content.6.RP.A.3 : Complete graphs and tables by measuring and evaluating evidence.

CCSS.MATH.Content.6.SP.B.5A : Document the number of observations by identifying suspects connected to each piece of evidence at the end of the lesson.

CCSS.MATH.Content.6.SP.B.5B : Measure your evidence and document your numerical findings in the proper unit of measurement.

STANDARDS MATRIX

Standard	Lesson											
	1	2	3	4	5	6	7	8	9	10	11	12
Next Generation Science Standards												
Practice: Asking Questions and Defining Problems		*	*	*	*	*	*	*	*	*	*	
Practice: Planning and Carrying Out Investigations	*		*		*	*		*	*	*	*	*
Practice: Analyzing and Interpreting Data	*	*	*	*	*	*	*	*	*	*	*	
Practice: Engaging in Argument from Evidence	*		*		*	*		*	*	*	*	
Practice: Obtaining, Evaluating, and Communicating Information	*					*						*
Cross-Cutting Concept: Patterns	*					*						
Disciplinary Core Idea: PS1-A: Structure and Properties of Matter				*			*					
Disciplinary Core Idea: PS1-B: Chemical Reaction		*		*			*		*			
Disciplinary Core Idea: PS2-A: Force and Motion			*			*	*					
Disciplinary Core Idea: PS2-B: Types of Interactions			*			*	*					
Disciplinary Core Idea: PS3-C: Relation Between Energy and Forces			*			*	*					
Common Core State Standards												
CCSS.ELA-Literacy.RI.6.1 : Cite textual evidence to support analysis of what the text says explicitly as well as inferences drawn from the text.	*		*		*	*		*	*	*	*	*
CCSS.ELA-Literacy.RI.6.2 : Determine a central idea of a text and how it is conveyed through particular details; provide a summary of the text distinct from personal opinions or judgments.	*		*		*	*		*	*	*	*	*
CCSS.ELA-Literacy.RI.6.3 : Analyze in detail how a key individual, event, or idea is introduced, illustrated, and elaborated in a text (e.g., through examples or anecdotes).	*		*		*	*		*	*	*	*	*
CCSS.ELA-Literacy.RI.6.7 : Integrate information presented in different media or formats (e.g., visually, quantitatively) as well as in words to develop a coherent understanding of a topic or issue.	*	*	*			*	*	*	*		*	
CCSS.ELA-Literacy.RI.6.8 : Trace and evaluate the argument and specific claims in a text, distinguishing claims that are supported by reasons and evidence from claims that are not.								*	*		*	
CCSS.ELA-Literacy.RL.6.3 : Describe how a particular story's or drama's plot unfolds in a series of episodes as well as how the characters respond or change as the plot moves toward a resolution.	*				*			*			*	*

CCSS.ELA-Literacy.RL.6.4 : Determine the meaning of words and phrases as they are used in a text, including figurative, connotative, and technical meanings.	*		*		*	*		*	*	*	*	*
CCSS.ELA-Literacy.RST.6-8.3 : Follow precisely a multistep procedure when carrying out experiments, taking measurements, or performing technical tasks.		*	*	*		*	*		*	*		
CCSS.ELA-Literacy.SL.6.1 : Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grade appropriate topics, texts, and issues, building on others' ideas and expressing their own clearly.	*	*	*	*	*	*	*	*	*	*	*	*
CCSS.ELA-Literacy.SL.6.4 : Present claims and findings, sequencing ideas logically and using pertinent descriptions, facts, and details to accentuate main ideas or themes; use appropriate eye contact, adequate volume, and clear pronunciation.	*	*	*	*	*	*	*	*	*	*	*	*
CCSS.ELA-Literacy.SL.6.6 :Adapt speech to a variety of contexts and tasks, demonstrating command of formal English when indicated or appropriate.					*						*	
CCSS.ELA-Literacy.W.6.1 : Write arguments to support claims with clear reasons and relevant evidence.					*	*	*	*	*	*	*	*
CCSS.ELA-Literacy.W.6.9 : Draw evidence from literary or informational texts to support analysis, reflection, and research.	*		*		*	*	*	*	*			
CCSS.MATH.Content.6.RP.A.3 : Use ratio and rate reasoning to solve real-world and mathematical problems. For example, make tables of equivalent ratios relating quantities with whole-number measurements, find missing values in the tables, and plot the pairs of values on the coordinate plane. Use tables to compare ratios.	*					*						
CCSS.MATH.Content.6.SP.B.5A : Summarize numerical data sets in relation to their context, such as by: Reporting the number of observations.	*		*		*	*	*	*	*			
CCSS.MATH.Content.6.SP.B.5B : Summarize numerical data sets in relation to their context, such as by: Describing the nature of the attribute under investigation, including how it was measured and its units of measurement.		*				*						