Pneumatic Learning Grid

Objective Number	NGSS Grade 6-8 ● = Fully covered ◐ = Partially covered	Activities				Designing and Making	
		Scissor Lift	Robot Hand	Stamping Press	Robot Arm	Dinosaur	Scarecrow
Disciplinary Core Ideas: Physical Science							
1	MS-PS2 Motion and Stability: Forces and Interactions	◐	◐	◐	◐	◐	◐
2	MS-PS3 Energy	◐	●	◐	◐	◐	◐
Crosscutting Concepts							
1	Patterns	◐	◐	◐	●	◐	◐
2	Cause and effect: Mechanism and explanation	●	●	●	●	●	●
3	Scale, proportion, and quantity	◐	◐	◐	◐	◐	◐
4	Systems and system models	●	●	●	●	●	●
5	Energy and matter: Flows, cycles, and conservation	◐	◐	◐	◐	◐	◐
6	Structure and Function	●	●	●	●	●	●
7	Stability and change	●	●	●	●	●	●
Science and Engineering Practices							
1	Asking questions and Defining Problems	●	●	●	●	●	●
2	Developing and using models	●	●	●	●	●	●
3	Planning and carrying out investigations	●	●	●	●	●	●
4	Analyzing and interpreting data	●	●	●	●	●	●
5	Using mathematics, Informational and Computer Technology, and computational thinking	◐	◐	◐	●	●	●
6	Constructing explanations and designing solutions	●	●	●	●	●	●
7	Engaging in argument from evidence	◐	◐	◐	●	●	●
8	Obtaining, evaluating, and communicating information	●	●	●	●	●	●

Objective Number	Common Core State Standards Grade 6-8 ● = Fully covered ◐ = Partially covered	Activities				Designing and Making	
		Scissor Lift	Robot Hand	Stamping Press	Robot Arm	Dinosaur	Scarecrow
Mathematical Practice							
MP1	Make sense of problems and persevere in solving them	◐	◐	◐	◐	◐	◐
MP2	Reason abstractly and quantitatively	◐	◐	◐	◐	◐	◐
MP3	Construct viable arguments and critique the reasoning of others	◐	◐	◐	◐	◐	◐
MP4	Model with mathematics	●	●	●	●	●	●
MP5	Use appropriate tools strategically	●	●	●	●	●	●
MP6	Attend to precision	◐	◐	◐	◐	◐	◐
MP7	Look for and make use of structure	◐	◐	◐	◐	◐	◐
MP8	Look for and express regularity in repeated reasoning	◐	◐	◐	◐	◐	◐
Ratios & Proportional Relationships							
7.RP.A	Analyze proportional relationships and use them to solve real-world and mathematical problems	◐	◐	◐	◐		
Speaking and Listening							
SL 6-8.1	Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grade 7 topics, texts, and issues, building on others' ideas and expressing their own clearly	●	●	●	●	◐	◐
SL 6-8.4	Present claims and findings, emphasizing salient points in a focused, coherent manner with pertinent descriptions, facts, details, and examples; use appropriate eye contact, adequate volume, and clear pronunciation	◐	◐	◐	◐	◐	◐
Reading Standards for Literacy in Science and Technical							
RST 6-8.3	Follow precisely a multistep procedure when carrying out experiments, taking measurements, or performing technical tasks	●	●	●	●		
RST 6-8.4	Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 6-8 texts and topics	●	●	●	●		
RST 6-8.7	Integrate quantitative or technical information expressed in words in a text with a version of that information expressed visually (e.g., in a flowchart, diagram, model, graph, or table)	●	●	●	●	●	●
Writing Standards for Literacy in History/Social Studies, Science & Technical Subjects							
WHST. 6-8.1	Write arguments focused on discipline-specific content	●	●	●	●		
WHST. 6-8.2	Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes	●	●	●	●		
WHST. 6-8.4	Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience	●	●	●	●		
WHST. 6-8.5	With some guidance and support from peers and adults, develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on how well purpose and audience have been addressed	◐	◐	◐	◐		
WHST. 6-8.6	Use technology, including the Internet, to produce and publish writing and present the relationships between information and ideas clearly and efficiently	◐	◐	◐	◐		
WHST. 6-8.7	Conduct short research projects to answer a question (including a self-generated question), drawing on several sources and generating additional related, focused questions that allow for multiple avenues of exploration	●	●	●	●		

Observation Checklist Part 1 **Science and Engineering Practices** **Grade 6-8** Use the Bronze (1), Silver (2), Gold (3), and Platinum (4) proficiency level descriptions, or another assessment scale that is relevant to your school context.		Name(s)										
Practice 1: I observed students asking questions												
a	to seek more information.											
b	to seek evidence for a claim.											
c	to challenge a claim or interpretation of data.											
d	to identify and understand independent and dependent variables.											
e	that can be investigated in this class.											
Practice 2: I observed students developing and/or using a model												
a	to explore its limitations.											
b	to explore what happens when parts of the model are changed.											
c	to show the relationship between variables.											
d	to make predictions.											
e	to generate data about what they are designing or investigating.											
Practice 3: I observed students planning and carrying out investigations												
a	that included independent and dependent variables and controls.											
b	that included appropriate measurement and recording tools.											
c	that tested the accuracy of various methods for collecting data.											
d	to collect data to answer a scientific question or test a design solution.											
e	to test the performance of a design under a range of conditions.											
Practice 4: I observed students analyzing and interpreting data												
a	by constructing graphs.											
b	to identify linear and non-linear relationships.											
c	to distinguish between cause and effect vs. correlational relationships.											
d	by using statistics and probability such as mean and percentage.											
e	to determine similarities and differences in findings.											
f	to determine a way to optimize their solution to a design problem.											
Notes:												

Observation Checklist Part 2		Name(s)										
Science and Engineering Practices **Grade 6-8** Use the Bronze (1), Silver (2), Gold (3), and Platinum (4) proficiency level descriptions, or another assessment scale that is relevant to your school context.												
Practice 5: I observed students using mathematics and computational thinking												
a	by including mathematical representations in their explanations and design solutions.											
b	by using an algorithm to solve a problem.											
c	by using concepts such as ratio, rate, percent, basic operations, or simple algebra.											
Practice 6: I observed students constructing explanations and design solutions												
a	that included quantitative and qualitative relationships.											
b	that are based on scientific ideas, laws and theories.											
c	that connect scientific ideas, laws, and theories to their own observations.											
d	that apply scientific ideas, laws, and theories.											
e	to help optimize design ideas while making tradeoffs and revisions.											
Practice 7: I observed students engaging in arguments from evidence												
a	that compare and critique two arguments on the same topic.											
b	while respectfully providing and receiving critiques using appropriate evidence.											
c	while presenting oral or written statements supported by evidence.											
d	while evaluating different design solutions based on agreed-upon criteria and constraints.											
Practice 8: I observed students evaluating and communicating information												
a	when they read scientific text adapted for the classroom.											
b	when they read or wrote information in combinations of text, graphs, diagrams, and other media.											
c	when they created presentations about their investigations and/or design solutions.											
Notes:												