NGSS Connections to the Kindergarten Lesson Sequence

K-PS2-1 Motion and Stability: Forces and Interactions

http://www.nextgenscience.org/pe/k-ps2-1-motion-and-stability-forces-and-interactions

The materials/lessons/activities outlined in this article are just one step toward reaching the Performance Expectations listed below. Additional supporting materials/lessons/activities will be required.

Performance Expectation	**Connections to Classroom Activity**
K-PS2-1: Plan and conduct an investigation to compare the effects of different strengths or different directions of pushes and pulls on the motion of an object.	• Students use a ramp to investigate the effects of different car masses on how far a block is pushed.
Science and Engineering Practices	
Planning and Carrying Out Investigations **Connections to the Nature of Science** Scientists use different ways to study the world. Scientists look for patterns in the natural world.	• Students decide how to test the impact of different car masses on the distance a block is moved when they collide. • Students design a way to record how far each car pushes the block. • Students predict how far a new car would push the block using data from the previous investigations. • Students reflect on how scientists use different ways to study the world in the three activities. During the Forces & Motion activity, we ask, *"When you were testing your ideas, I saw different groups trying different things. Why is that a good thing we tried different ways? Why would it be good for scientists to test ideas in different ways?"* • Students reflect on how scientists use patterns in each Kindergarten activity. During the Forces & Motion activity, we ask, "You noticed a pattern when you said the heavier the car is, the more it pushes the block. Why might scientists look for patterns? How do patterns help us understand things?"
Disciplinary Core Idea	
PS2.A: Forces and Motion • Pushes and pulls can have different strengths and directions. PS2.B: Types of Interactions • When objects touch or collide, they push on one another and can change motion.	• Students use a ramp to investigate the effects of different car masses (push strength) on how far a block is pushed.
Crosscutting Concepts	
Cause and Effect **Connections to the Nature of Science** Creativity and Imagination are important in science	• Students explain how the mass of the car causes the block to move different distances. • During each activity, students reflect on how scientists are creative. In the Forces & Motion activity, we ask, "When you were doing this activity with the cars and blocks, when did you have to be creative? How might being creative be useful for scientists?

NGSS Connections to the 4th Grade Lesson Sequence

4-ESS1-1 Earth's Place in the Universe *http://www.nextgenscience.org/dci-arrangement/4-ess1-earths-place-universe* The materials/lessons/activities outlined in this article are just one step toward reaching the Performance Expectations listed below. Additional supporting materials/lessons/activities will be required.	
Performance Expectation	**Connections to Classroom Activity**
4-ESS1-1: Identify evidence from patterns in rock formations and fossils in rock layers to support an explanation for changes in landscape over time.	• Students examine kinetic sand layers, find fossils in each layer, and develop an explanation of how the landscape has changed based on the types of fossils have changed.
Science and Engineering Practices	
Constructing Explanations	• Students construct explanations regarding the change in fossils from shells to plant life.
Disciplinary Core Idea	
ESS1.C: The History of Planet Earth The presence and location of certain fossil types indicate the order in which rock layers were formed	• Students examine kinetic sand layers, find fossils in each layer, and develop an explanation of how the landscape has changed based on the types of fossils have changed.
Crosscutting Concepts	
Patterns **Connections to the Nature of Science** Scientists look for patterns in the natural world.	• Students use patterns of fossils and sand layers to explain how the landscape has changed over time and apply these patterns to real rock layer photographs. • During each activity, students reflect on how scientists use patterns. In the Fossil Hunting activity, we ask, "What patterns did you notice in this activity? How might scientists who study fossils (called paleontologists) also use patterns in their work?"
Connections to Nature of Science (Modified from NGSS Appendix H)	
NOS Connection: Observations and Inferences NOS Connection: Observational Science	• In each activity, we students consider the role of observation and inferences in science. During the Fossil Hunting lesson, we ask, "What are some observations and some inferences we can make about the sand? Why are both observations and inferences useful in science? • During all three activities, students reflect on observations and inferences. In the Fossil Hunting lesson, we ask, "In this activity, you did no experiments. In what sense is studying rock layers and fossils still science? Why might observational science also be important?"