3-PS2-2 Motion and Stability: Forces and Interactions

Students who demonstrate understanding can:

3-PS2-2. **Make observations and/or measurements of an object's motion to provide evidence that a pattern can be used to predict future motion.** [Clarification Statement: Examples of motion with a predictable pattern could include a child swinging in a swing, a ball rolling back and forth in a bowl, and two children on a see-saw.] [*Assessment Boundary: Assessment does not include technical terms such as period and frequency.*]

The performance expectation above was developed using the following elements from the NRC document *A Framework for K-12 Science Education*:

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.

	Observable features of the student performance by the end of the grade:	
1	Identifying the phenomenon under investigation	
	a	From the given investigation plan, students identify and describe the phenomenon under investigation, which includes observable patterns in the motion of an object.
	b	Students identify and describe the purpose of the investigation, which includes providing evidence for an explanation of the phenomenon that includes the idea that patterns of motion can be used to predict future motion of an object.
2	Identifying the evidence to address the purpose of the investigation	
	a	Based on a given investigation plan, students identify and describe the data to be collected through observations and/or measurements, including data on the motion of the object as it repeats a pattern over time (e.g., a pendulum swinging, a ball moving on a curved track, a magnet repelling another magnet).
	b	Students describe how the data will serve as evidence of a pattern in the motion of an object and how that pattern can be used to predict future motion.
3	Planning the investigation	
	a	From the given investigation plan, students identify and describe how the data will be collected, including how:
		i. The motion of the object will be observed and measured.
		ii. Evidence of a pattern in the motion of the object will be identified from the data on the motion of the object.
		iii. The pattern in the motion of the object can be used to predict future motion.
4	Collecting the data	
	a	Students make observations and/or measurements of the motion of the object, according to the given investigation plan, to identify a pattern that can be used to predict future motion.