


Short Performance Assessment: 4-PS3-3

Grade Level: **Fourth Grade**

Adapted from [SNAP](#)¹

Title	Newton's Cradle		
Designed by	Paul Andersen	Course(s)	NGSS Grade 4
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Performance Expectation	<p>4-PS3-3: Ask questions and predict outcomes about the changes in energy that occur when objects collide.</p> <p>Clarification Statement: Emphasis is on the change in the energy due to the change in speed, not on the forces, as objects interact.</p> <p>Assessment Boundary: Assessment does not include quantitative measurements of energy.</p>
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Science and Engineering Practice	<p>Asking Questions</p> <ul style="list-style-type: none"> Ask questions that can be investigated and predict reasonable outcomes based on patterns such as cause and effect relationships.
Disciplinary Core Ideas	<p>PS3.A: Definitions of Energy</p> <ul style="list-style-type: none"> Energy can be moved from place to place by moving objects or through sound, light, or electric currents. <p>PS3.B: Conservation of Energy and Energy Transfer</p> <ul style="list-style-type: none"> Energy is present whenever there are moving objects, sound, light, or heat. When objects collide, energy can be transferred from one object to another, thereby changing their motion. In such collisions, some energy is typically also transferred to the surrounding air; as a result, the air gets heated and sound is produced. <p>PS3.C: Relationship Between Energy and Forces</p> <ul style="list-style-type: none"> When objects collide, the contact forces transfer energy so as to change the object's' motions.
Crosscutting Concept	<p>Energy and Matter</p> <ul style="list-style-type: none"> Energy can be transferred in various ways and between objects.

Student Performance	<ol style="list-style-type: none"> Addressing phenomena of the natural world Identifying the scientific nature of the question
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¹ The Short Performance Assessment (SPA) and the Assessment Rubric adapted from the Stanford NGSS Assessment Project <http://snapgse.stanford.edu/>



Name _____




Newton's Cradle

The Newton's cradle pictured to the right will continue swinging forever because it is a video loop. However an actual Newton's cradle will eventually come to a stop.



You can watch a [slow motion video on Wikipedia](#).

1. To understand this phenomenon you will be asking questions about energy. Write as many as you can!
(*HINT: Use the word energy in your questions!*)

	Energy questions
<p>Before collision</p> 	
<p>During collisions</p> 	
<p>After Newton's cradle stops</p> 	



2. Imagine you are given access to the Newton's cradle and you are able to investigate one of the questions you asked on the previous page.

<p>What is your testable question? (Be sure it's related to energy transfer)</p>	
<p>Sketch and describe how your investigation would work?</p>	
<p>What do you predict the results would be?</p>	

