

Constructed Response 2.1

Name _____

Period _____

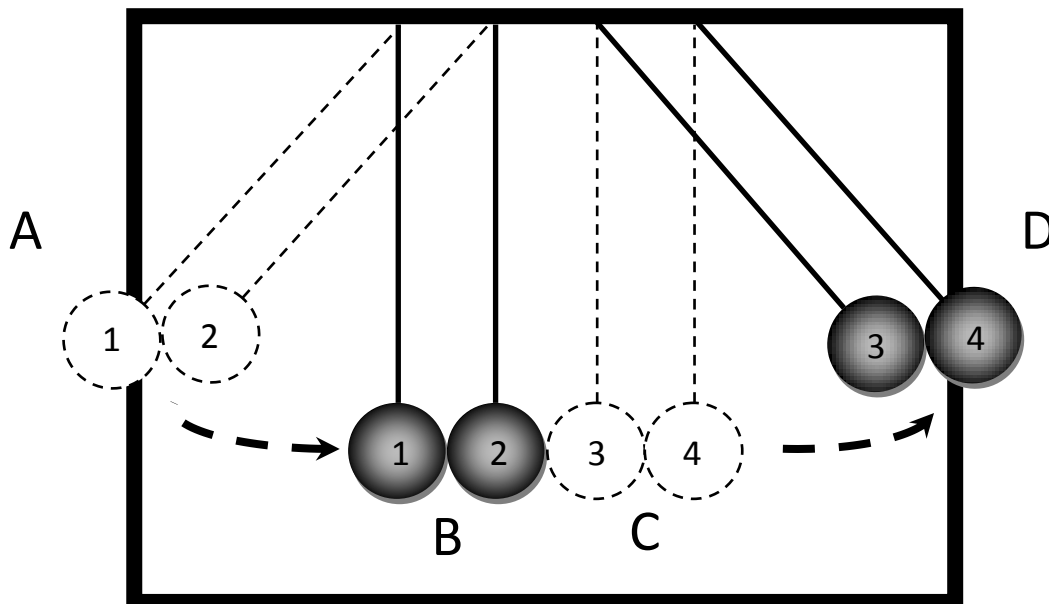
The law of conservation of momentum states that, “in the absence of outside forces, the total momentum of objects that interact will not change. The amount of momentum is the same before and after they interact.”

Consider the following situation which takes place in the absence of frictional forces (*hard to believe, but just consider there is no friction for this problem*).

Below is an illustration of something called “Newton’s Cradle.” In addition to being an amusing desk toy, many science classrooms use it to demonstrate the law of conservation of momentum. Consider the following for this CONSTRUCTED RESPONSE:

1. 4 balls of equal mass (1 kilogram) are hung from a stationary frame.
2. Balls 1 and 2 are raised together to position A and then released.
3. Balls 1 and 2 accelerate downward striking stationary balls 3 and 4. Balls 1 and 2 come to rest at position B.
4. Balls 3 and 4 are observed to accelerate from position C and climb to position D.
5. The instantaneous speed of balls 1 and 2 right at the moment of impact at position B was measured to be 1 m/s.
6. The instantaneous speed of balls 3 and 4 right after they depart position C was measured to be 1 m/s.

Using this information, explain how (using data and your understanding of the conservation of momentum law) to show why Newton’s Cradle behaves this way. Write your response on the back of this sheet of paper.



To see a real Newton’s Cradle in action, visit the following web site:

<http://www.wfu.edu/physics/demolabs/demos/1/1n/1n3020a.mpg>

Answer the question (Q&A format), **C**ite evidence (2-3 pieces of information), **E**xplain how your evidence supports your answer.