Newton's Cradle Mystery Lab

Materials: Two rulers with grooves (no holes), 9 marbles, masking tape, two books

Instructions:

Create a 'V' by taping the two rulers together lengthwise and propping up the ruler ends between the 'canyon' of the books. The angle of incline for the two rulers should be the same.

Make predictions about what you think will happen when you release the marble(s) so that it rolls down and runs into the marbles on the ruler. Predict how many marbles, if any, will roll off the end of the ruler after the collision, and record your prediction on the data table. Then perform the task and record on the data table the number of marbles on the ruler and the number you intend to release.

Trial	# released down	# at the bottom	# moving up	
			Prediction	Result
1	1	8		
2	2	7		
3	3	6		
4	4	5		

1. What happened when you rolled one small marble down to collide with the eight on the ruler? How many marbles moved up the other ruler?

2. What happened when you rolled two marbles down to collide with seven?

3. Was there any apparent relationship between the number of marbles you rolled down the ruler and the number that rolled up the other side?

4. How did the mass of the marbles rolling down the ruler compare with the mass of the marbles that rolled up the other ruler in the first two trials?

5. Was there anything noticeably different about the speeds with which marbles rolled up the ruler when compared to speed at which marbles rolled down?

6. How do your answers to the previous questions relate to the law of the conservation of momentum? Use the conservation of momentum equation in your answer.

7. Would it be possible for three marbles to roll down the ruler at once and then have one marble roll up the other side with three times the velocity as those that rolled down? Would momentum be conserved in such a scenario?

8. When a single marble initially rolls down the ruler, how many collisions occur before one marbles roll up the other side? _____
9. What is the mystery of Newton's Cradle?