Metacognitive Reflection prompts: Relativity Chapter 4 – Applications of Relativistic Conservation Laws
Due: (recommended) Sunday evening February 24; (required) Wednesday evening February 27. It seems to me that it would be a good idea to respond to the problem set oriented questions (the first five) by Sunday in preparation for Monday's exam, while you could probably save the last two questions for submission by the Wed. Feb. 27 due date.

I encourage you to type up your responses first and save that document, and then copy and paste your response in the appropriate place in the MasteringPhysics assignment.

Consider your work on the Problems in Relativity Chapter 4. Think about your individual work and, if relevant, your group work, and what you learned by working through these questions. Compare your work to the provided solution set (which you can find at the program web-site, under Assignments: Physics, and scroll down to Week 7).

Your responses should clearly:
- indicate engagement with some or all of the Prompts below
- indicate engagement with the provided Solutions

Standard Prompts
You need not answer all the standard prompts for all (or any) of the questions, but you might consider them all as you reflect on your learning this past week.
- What questions did you have about the set of concepts/skills in this set of problems that have been answered through your practice?
- What questions do you still have about this set of concepts/skills?

Problem-solving
Problems 1 – 10 on this set likely required a robust problem-solving approach and execution. For each of the following, please reflect on and describe your approach and execution, and compare them to the provided solutions:

a) General strategy. Did you draw a sketch? How did you keep track of knowns and unknowns? How did you identify which physics equations and principles to use, and when to use them? How did these compare with what I tried to model for you in the solutions?

b) Structure/layout: There is a significant amount of information to generate and keep track of in these kinds of problems. A systematic approach combined with a neat and ordered layout on your page can help. What was your approach? How did this compare with what I tried to model for you in the solutions?

c) Math: lots of places to get it right and to get it wrong. What successes did you have (especially when considering things which might have given you difficulty in the past)? What struggles did you have? What will you need to pay particular attention to in the future? Any insights from looking at the solutions?

d) Units: It's imperative that you put units on your final answers – how did you do with that? There are number of productive short-cuts you might take with units during intermediate steps – did you find any short-cuts that helped you out? You'll notice that I showed many short-cuts in my solutions – did you find any that might be useful to you?

Problems 2, 4, 7, 10
a) These problems had a similar structure. What did you notice is similar in these problems? What did you notice is unique to each situation?

b) What, if anything, did you learn when looking at the solutions?

Problem 1

a) This problem gave many of you difficulty. I suspect that much of the difficulty was mathematical – this problem probably demanded the most algebraically of any of the problems on this set. What were the mathematical difficulties you faced (or that you saw or guessed other students faced)?

b) What, if anything, did you learn when looking at the solutions?

Problems 5, 6, 8, 9

a) In these problems, the vector nature of momentum needed to be explicitly accounted for. Where did the vector nature of momentum show up? Did you keep track of this correctly in your early attempts at these problems? How has your practice helped you pay attention to this important bit of physics?

b) Did you (or did you see other students, or can you explain why someone might) try to put a negative sign on the energy of left-moving particles? Why don't left-moving particles get a negative sign on their energy, when they do for their momentum? How has your practice helped you pay attention to this important bit of physics?

c) What, if anything, did you learn when looking at the solutions?

Problems 11 - 15

a) In your Reading Responses to this chapter, many of you expressed interest in fusion and fission. How did our lecture discussion and/or your practice on the problem set and/or your re-reading the chapter or following up with your own research connect with that interest?

b) In your Reading Response to this chapter, many of you expressed confusion about interpreting Figure 4.3 and Example 2. Did our lecture discussion and your practice help with that confusion? If so, in what ways? If not, what confusion do you still have? How have you tried to address that confusion?

Static vs. "interactive" solutions

There were two sorts of solutions provided. One was a static printout. The other was a slightly more interactive PowerPoint presentation. If you used both, did one version help you to learn the material better? What about the format did you find helped your learning?

Personal Response

a) What did you find most challenging in this chapter, both in the concepts covered and the problems you solved?

b) What did you find most interesting/intriguing in this chapter, both in the concepts covered and the problems you solved?