Name: _____

Date: _____

Cornell University
Prison Education Program

Conceptual Physics
Reading Quiz 8

Due Date: April 20 (before class)

This reading assignment covers the material that we will discuss and work on next week. Our class activities will **assume** that you have read the assigned material, therefore it is **very important** that you do so to get the most out of the class!

The authors for the two different books take 2 different approaches to explaining time dilation. The *Light and Matter* people talk about Lorentz contractions and how they effect position versus time graph, skewing them to show how things change. The *College Physics* people use intricate geometry in a specific example. I encourage you to think about how the two are similar/different.

1. *Light and Matter* Chapter 23 (Section 1)

   This chapter covers relativity and magnetism, however we will only discuss relativity next class. The author spends a lot of time talking about distorted graphs. If you are comfortable with graphs, I encourage you to pay attention to the explanations since they are quite insightful. If you are uncomfortable with graphs, it's OK - we will spend most of our time in class talking about time dilation and length contraction without them.

   The γ factor provides a quantitative way of describing how time/space are dilated/contracted for observers moving with respect to each other. Since we do not a have access to calculators, we will not be computing this factor when solving problems.

2. *College Physics* Chapter 28 (Sections 1 to 3)

   Pay attention to the postulates and definitions in this section. In particular, the author's discuss a confusing notion: It is possible for an observer to say 2 events occur simultaneously, while another observer says one occurs before/after the other. You may want to read the section on simultaneity a couple times, and parse out step by step what's happening with the train example. We will go over it again in class.

As part of the reading, please complete the pre-class quiz *before* coming to class. They will be collected at the very beginning.

Question for *Light and Matter* Chapter 23

1. (1 point) When two observers in different frames of reference observe one another, do they perceive the other one's perception of space and time to be normal or distorted?

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2. (1 point) What is time dilation?

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3. (1 point) What is length contraction?

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Question for *College Physics* Chapter 28

1. (1 point) What is an inertial frame of reference?

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2. (1 point) What is Einstein's first postulate of special relativity?

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3. (1 point) What is Einstein's second postulate?

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4. (2 points) What is proper time?

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5. (2 points) What is proper length?

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