

Subject: Science

Grade: Twelfth - Physics

Standard: #8 Historical Perspectives

Key Concept: Einstein's special theory of relativity brought about revolutionary changes in human understanding of nature.

Generalization: The special theory of relativity describes how time is affected by motion in space at constant speed and how mass and energy are related.

Background:

Students have been studying special relativity related to time and space. Since this is a concept that doesn't agree with our common sense, it may be difficult for many students. This lesson allows students to demonstrate their understanding of the topic in a way that is less threatening than a test.

This lesson is tiered in *product* according to *learning style*.

Students may work individually or in groups, although the Actors will need to be in groups for at least part of the activity. All products will be presented to the class.

Tier I: *Analyzers*

The Analyzers will watch five episodes of Star Trek (original, Deep Space Nine, Next Generation, and/or Voyager) or two Star Trek movies. They will analyze the works, looking for instances in which the special theory of relativity is used, overtly or covertly, or where it is used improperly. Their presentation to the class should include clips of the films/shows to illustrate their points.

Tier II: *Writers*

The Writers will write and illustrate a children's book about the special theory of relativity. The book should have a specified minimum number of pages and be bound.

Tier III: *Actors*

The Actors will adapt the book, Einstein's Dreams, to a one act play with at least three scenes. They will present the play, complete with props and costumes.

Assessment:

Teacher observation and student interviews during the investigation will serve as formative assessments. This assignment will take several class periods and should be assessed accordingly. Since the products are different, a rubric for each product should be developed and shared with the students before they begin the lesson. For assistance in writing a variety of rubrics, StandardWriter© software is excellent. Students will share their products with the class, thus you may wish to add a peer evaluation instrument developed for presentation skills.