

Physics Workshop: November 2, 2007

### **Research Base**

1. Research indicates that students learn by constructing their own knowledge. As teachers, we cannot simply hand them our understanding. PhET simulations are designed to give students opportunities to construct knowledge.
2. Students create new understanding based on what they already know. PhET simulations incorporate everyday, realistic objects and settings to help students see that their understanding of how things work is consistent with scientific explanations.

References: How People Learn, National Academy Press, Children's Ideas in Science, Driver, Guesne and Tiberghien, College Pathways to the Science Education Standards, National Science Teachers Association Press

### 3. PhET research interests are:

- How the simulations affect the students' ability to solve conceptual and quantitative problems; attitudes about learning physics; and perceptions of their own learning and of the simulations themselves.
- Simulation effectiveness in different environments: How might these simulations be used in labs? Can they replace traditional hands-on experiments? When students use simulations as preparation activities for class, how do they compare to traditional class preparation activities such as reading the text or doing homework problems? Are the simulations more effective standalone (as an open play area) or wrapped with a guiding tutorial?

References: See the PhET research page at <http://phet.colorado.edu>

### **Compare these two activities: What will students learn in each activity?**

1. Make the man start at -5 meter mark, move with constant speed to the 2 meter mark and then accelerates to the 8 meter mark.
  - A. Sketch the position, velocity and acceleration graphs that you see.
  - B. How do the three graphs relate?
2. Sketch what you think the graphs will look like for this story that Jill told:

“Bobby was talking to me on his cell phone standing by his car. The phone signal was poor, so he walked toward his house trying to get a better signal and then stood still so we could talk.”

  - A. Explain why each part of your graph makes sense.
  - B. Test your ideas using the simulation

### **Plan an Activity:**

1. Choose a simulation
2. Outline an activity that uses the simulation using the handouts Activity Design and Creating PhET Activities using Guided Inquiry Strategies