

August 30, 2010      Physics 121      Prof. E. F. Redish

■ **Theme Music: John Coltrane**  
*Welcome*

■ **Cartoon: Lynn Johnston**  
*For Better or for Worse*

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**Recitations and Labs**

- No lab this week or next.
- Go to your recitation section this week to
  - do a pre-test survey
  - get your picture taken
- Regular labs and recitations (tutorials) begin on 9/13.

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**Buy?**

- ☒ BUY a lab/tutorial manual.
- ☒ BUY a clicker
  - Bring it to every class.
  - Register it at <http://my.umd.edu> under the *Academics and Testudo* tab
- ☒ BUY Mastering Physics
  - The on-line HW product.
- ☐ You do not have to buy a text.  
If you want one, you might like
  - Tauger,
  - Knight et al.,
  - Cummings et al. (available to this class on-line)

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This class is designed to help you develop a deeper understanding of science. Why?

- “Adaptive expertise”
- Self-preservation (both mine and yours)
- Why not? Physics is a good place to do this!

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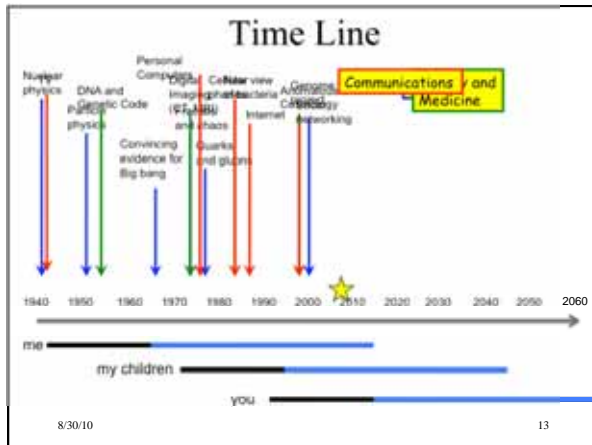
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## Adaptive expertise

- The rapid pace of change in science implies that critical skills for scientists (and health-care professionals) in the next few decades will be
  - the ability to continue to learn
  - the ability to understand the implications of new discoveries
  - the ability to integrate new tools and knowledge into their practice of science.

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## Why physics?

- Physics is a good place to develop some general scientific skills associated with deeper learning and adaptive expertise.
- It connects with things you know from everyday experience.
- It helps develop tools of general value.
  - Quantification of experience
  - Multiple representations
  - Coherence
  - Mechanism
  - Building physical intuition

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## Class Info

- Webpages
  - <http://www.physics.umd.edu/courses/Phys121/Redish/>
- Blackboard
  - <https://elms.umd.edu/>
- Listserve
  - [phys121-02all-fal10@coursemail.umd.edu](mailto:phys121-02all-fal10@coursemail.umd.edu)

Main course info. Lots of good stuff.

For your eyes only.

If you haven't gotten any emails from me yet, see me!

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## Homework

- Three kinds
  - Online – typically a few exercises and online activities + about 4 (of my own) problems in MP. The one due Friday is just familiarizing yourself with the interface (but it's worth points).
  - Friday lecture – one long problem to write up on paper.
  - Tutorial HW – short, due in Tutorial.
- Work with others! But...
- Course Center!

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## Tutorials

- Discussion sections are run as group-learning sessions with worksheets.
- They will help to build difficult concepts and clarify confusing topics.
- They will focus on helping you understand, evaluate, and refine your intuitions.
- Tutorial HW a quick review of Tutorial ideas. (expect to spend ~15-30 min)
  - Graded 0-1 on ~5 elements.
  - Hand in at tutorial section

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## Labs

- Labs are required!  
Try very hard not to miss any.  
It will be difficult to make up missed labs.
- Labs will be non-traditional and will run over two weeks (4 hours)
- You will work in groups of 4 and create one lab report per group
- You will design, carry out, analyze, and present your results to the class.
- You will use *Excel* to analyze your data.

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## Theme of the Laboratory: Understanding Measurement



- Although we will be using physics concepts learned in lecture, reading, and tutorial in lab, demonstrating their correctness will NOT be the point of the lab.
- The goal of the laboratory will be to have you learn to think about measurement and data.
  - How does your goal affect your experimental design?
  - How does your experimental design affect your data?
  - How trustworthy is your data?
  - Why should someone believe your result?
  - When are two results “close enough” that we can say they agree?
  - When two results differ, how can we decide what is the correct answer?

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## Exams

- Two midsemester exams and one final.
- Exams will be about thinking, not memorizing.
- Midsemester exams
  - Given on Friday
  - Returned on Monday and gone over in class
- Written regrade requests encouraged
- Makeup exams the following Thursday (out of class) for anyone who wants, but...

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## Exams will include...

- A multiple-choice or short answer set of questions on translating representations (~25-30%)
- Two problems to work out and explain – typically with symbols, not numbers (~50%)
- An essay question (~10%)
- An estimation problem (~15%).

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## Grading

■ Hour exams (100 pts)	200
■ Quizzes (about)	100
■ Final exam (200 pts)	200
■ Homework (scaled to)	200
■ Lab (scaled to)	200
■ Participation	100
■ <b>Total</b>	<b>1000</b>

Estimate: A ~  $(85 \pm 3)\%$ , B ~  $(75 \pm 3)\%$ , C ~  $(65 \pm 3)\%$

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### Small barriers

- In this class there can be lots of small barriers that we need to take down.
- Most are not a big deal – they can be made sense of and cleared up in a couple of hours of work, thinking, and practice.
- But previous experience and phobias can make them hard to remove.
- The presence of a lot of these barriers can cause a lot of trouble. Clean up as many as you can!

*Don't be afraid to come in and say,  
"I'm confused about fractions" –  
or anything else!*

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