Announcements – 8/30/10

1. Welcome to Physics 123 Section 2
    o I'm Dr. Colton
    o TA is Chris Mackprang

2. This section is for majors and minors, only. If you are not a physics major/minor, please take section 1... meeting right now in 445 MARB. (There are at least 7 students on the waiting list for this section.)

3. We'll go over the syllabus shortly.
    o Hopefully you have already looked it over.
    o If you haven't, please look it over while you're waiting for class to start

4. As most of you have found out already, I send out periodic class-wide emails via Route Y. Make sure your email address there is current.

5. Results of survey

6. Passing around two signup sheets

7. Math review today right after class, in Underground Lab study area (you can follow me there)

Introductory Stuff

Syllabus

- **Course objectives:** fluids, heat, waves, sound, light, special relativity
- **Schedule**

	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
September	30 Lecture 1 Intro, Pressure Reading: syllabus, 14.1-14.2	31	1 Lecture 2; **HW 1** Archimedes' Principle Reading: 14.3-14.4	2	3 Lecture 3; **HW 2** Fluid motion Reading: 14.5-14.7	4 **Begin Lab 1** (Pressure)
	6 **Labor Day Holiday**	7 Lab 1 ongoing	8 Lab 1 ongoing Lecture 4; **HW 3** Thermal expansion, Ideal gas law Reading: 19.1-19.5	9 Lab 1 ongoing	10 Lab 1 ongoing Lecture 5; **HW 4** Kinetic Theory Reading: 21.1, 21.5 (and 21.6 if your book has it)	11 **Lab 1 due** **Begin Lab 2** (Specific Heat)
	13 Add/drop deadline; Lab 2 ongoing Lecture 6; **HW 5** Calorimetry Reading: 20.1-20.3	14 Lab 2 ongoing	15 Lab 2 ongoing Lecture 7; **HW 6** Heat transfer Reading: 20.7	16 Lab 2 ongoing	17 Lab 2 ongoing Lecture 8; **HW 7** 1st Law of Thermodyn. Reading: 20.4-20.6	18 **Lab 2 due**
	20 Lecture 9; **HW 8** Molar Specific Heats Reading: 21.2-21.4	21	22 Lecture 10; **HW 9** Heat engines Reading: 22.1, 22.5	23	24 Lecture 11; **HW 10** Refrigerators & Carnot Reading: 22.2-22.4	25
	27 Lecture 12; **HW 11** Entropy Reading: 22.6-22.7	28	29 Lecture 13; **HW 12** What is entropy? Reading: 22.8	30	1 Lecture 14; **HW 13** Waves Reading: 16.1-16.2	2 **Begin Exam 1: Thermodynamics**
	4 Exam 1 ongoing Lecture 15; **HW 14** Waves on a string Reading: 16.3-16.6; PpP 2.1-2.2	5 Exam 1 ongoing	6 Exam 1 ongoing Lecture 16; **HW 15** Complex exponentials Reading: PpP 1.1-1.4	7 Exam 1 ongoing	8 Exam 1 ongoing Lecture 17; **HW 16** Reflection, Transmission, Dispersion Reading: PpP 3.1-3.5, 5.1	9 **End Exam 1** Late fee after 5 pm **Begin Lab 3** (Dispersion)

    a. Reading assignments, lecture topics
    b. HW due dates (11:59 pm, but I think ESC closes earlier… 11 pm?)
    c. Lab start/end dates
    d. Exam start/end dates
    e. Term project dates

Grading: "guaranteed grade" curve

Grading: If you hit these grade boundaries, you are guaranteed to get the grade shown. I may make the grading scale easier than this in the end, if it seems appropriate, but I will not make it harder. Because the class is not graded on a curve, it is to your advantage to help each other!

A	93%	B+	84%	C+	73%	D+	60%
A-	89%	B	80%	C	69%	D	56%
		B-	77%	C-	64%	D-	50%

Grades will be determined by the following weights:

- Clicker quizzes: 5%
- 3 Midterm Exams: 30%
- Final Exam: 19%

- Term Project: 8%
- Labs/In-class writing: 8%
- Homework: 30%

Clicker quizzes: start next time
- Graded questions: 2 points if right, 1 point if attempted
- Ungraded "thought" questions: 1 point if attempted
- All questions from a day = 1 quiz
- 4 free quizzes, no make-up quizzes
- **Register your clicker via class website by Wed!**

Midterms, final, term project
$\rightarrow$ More info when time comes

Labs: Lab assignments at back of course packet
$\rightarrow$ First lab starts this Saturday

In-class writing: Done periodically, random student chosen

Extra credit: Read about that on your own

Class website:

physics.byu.edu → Courses → Class Web Pages → Physics 123 (Colton J)

Takes you to…

http://www.physics.byu.edu/faculty/colton/courses/phy123-fall10/

- Obtain CID (student ID number for the class)
- Register clicker
- Homework data sheets
- Homework submission/status   } I'll talk more about that in a bit
- Check your course grade
- Lab 3 and Lab 6 info (simulation labs)
- Study aids
    a. Videos of demos
    b. Past exams
    c. Class notes, possibly
    d. Etc.

> **Your best study aid:** the other students! Work together!

My office hours:
MWF 2-3 pm, Underground Lab study area

TA office hours: M 3-4 pm, W 2-3 pm, F 3-4 pm (same place)

The Computer-graded HW System

Syllabus packet contains problems:

1-1. Two boats start together and race across a 60-km-wide lake and back. Boat A goes across at [01] __3.43__ km/h and returns at the same speed. Boat B goes across at 30 km/h and its crew, realizing how far behind it is getting, returns at 90 km/h. Turnaround times are negligible, and the boat that completes the round trip first wins. (a) Which boat wins and (b) by how much time?

1-2. In order to qualify for the finals in a racing event, a race car must achieve an average speed of 250 km/h on a track with a total length of 1600 m. If a particular car covers the first half of the track at an average speed of [02] __8.20__ km/h, what minimum

Get your missing numbers ("data") from class website
→ *Put in the [xx]_____ spaces before you work the problem*

```
set 1. [01] 3.43 [02] 8.20 [03] 22.2 [04]
30.2 [05] 39.8 [06] 4.0
etc.
```

Answer range in packet, at end of list of problems:

1-1b. 15.0, 60.0 min
1-2. 300, 800 km/h
1-3a. 150, 210 km
1-3b. 60.0, 70.0 km/h

Indicates <u>units</u>, <u>range</u> and <u>decimal places</u> of answer

Type into website form: 63.8

Submit all answers at once

Partial credit, aka "retries"
- Points for each successive try: 5, 5, 3, 0
- If you miss, correct answer is given to you
- Use new data each time

Special case:
- <u>No retries</u> on multiple choice problems

Late submissions:
- Four free late submissions, chosen to give you most points
- All other late work only worth 50%
- (Includes paper-only problems)

"Computer graded" vs "Paper only"

Homework: What to turn in
(To slot labeled "physics 123, section 2" in the boxes near room N375 ESC)
1. For computer-graded problems: work from which you got your answer (must not be "gibberish")
2. For paper-only problems: all your work, and your answer

Be neat! (You'll thank me later! And maybe earn bonus pts...)

First homework due Wednesday night!

…and now, for the Physics

Chapters 1-13: Newtonian Mechanics
$\rightarrow$ covered in Physics 121

Chapter 14: Fluids (Static/Moving)
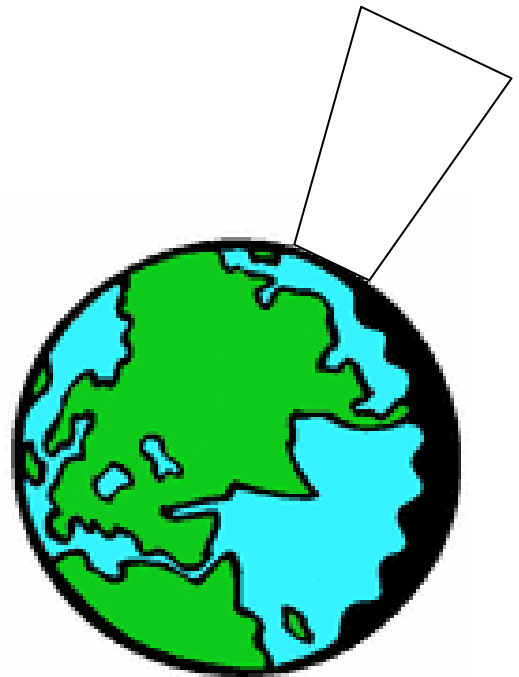$\rightarrow$ we'll start today

Pressure

$$P = \frac{Force}{Area}$$

Demos: pressure vs. force; bed of nails (with sledgehammer!)

Why do they never show anyone *standing* on a bed of nails?

Atmospheric pressure: 1 atm = 14.70 lbs/in^2 (psi)
$$= 1.013 \times 10^5 \text{ N/m}^2$$

Comes from…..

Demos: collapsing can; "Magdeburg hemispheres" (von Guericke and the first vacuum pump, 1654 demo for Ferdinand III)

Density

$$\boxed{\rho = \frac{mass}{volume}}$$

$\rho_{water} = 1000 \text{ kg/m}^3$

$\qquad\qquad = 1.000 \text{ g/cm}^3$ original definition of a gram

"Specific Gravity" = $\rho_{material}/\rho_{water}$

$\qquad\qquad$ (which is also the density in g/cm^3 units)

SG of some common substances:

Air, standard conditions	0.0013
Wood(Oak)	0.6 - 0.9
Liquid nitrogen	0.81
Ice	0.92
Water	1.00
Bricks	1.84
Aluminum	2.70
Steel	7.80
Silver	10.50
Lead	11.30
Gold	19.30
Platinum	21.40

Pressure vs depth in a fluid

Weight of water above some area A at a depth of *h*.

$w =$
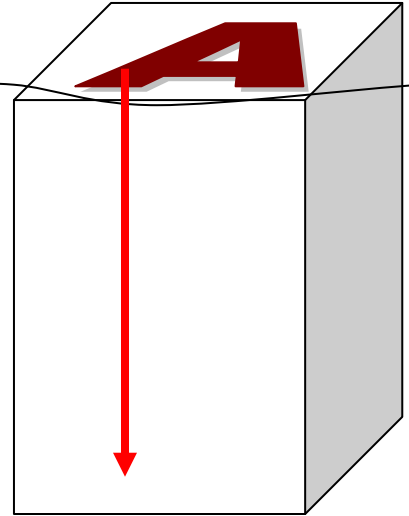
*Pressure at h*: (Include the pressure on the top of the fluid).

$P =$

Videos: pressure vs depth, pressure pushes on _____

Thought question: Where is the pressure greater, one meter beneath the surface of Lake Michigan or one meter beneath the surface of a swimming pool?
   a. Lake Michigan
   b. swimming pool
   c. the same

Pascal's principle: For a fluid at rest, the pressure in the fluid depends only on the depth, not the shape of the (open) container.
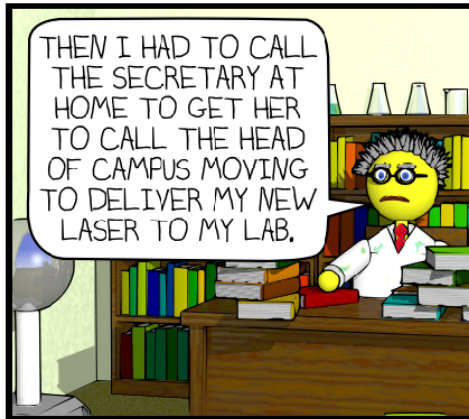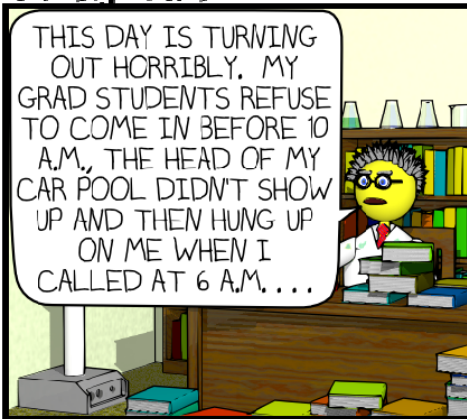
All parts of fluid at same _____ have same _____
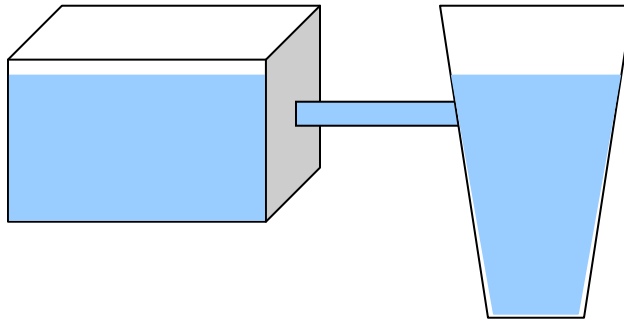
Demos: fluid levels; hydraulic "force amplification"

Summary: Work hard!

(More Strange Quark comics at Dr. Durfee's website, http://sqcomic.com/)

Summary: What you need to do ASAP

See also the "How to get started" section of the website.

Before class on Wednesday
- Get CID (via website, if you weren't emailed one)
- Get course packet
    - a. Read syllabus in detail
- Get textbook
- Get clicker
- Register clicker via course website
- Do reading assignment (section 14.3, 14.4)

Before Wednesday night
- Get individual homework data sheet via class website
- Do first homework assignment
- Submit HW via class website (this time around there are no paper-only problems)
- Turn in written work to HW box