

May 6th, 2010
Purdue University

Gerd Kortemeyer
Michigan State University

Assessment with LON-CAPA

<http://physics.lite.msu.edu/>

Username: Your “Alias”

Password: purdue

Select: LB 272 – Intro Physics ...

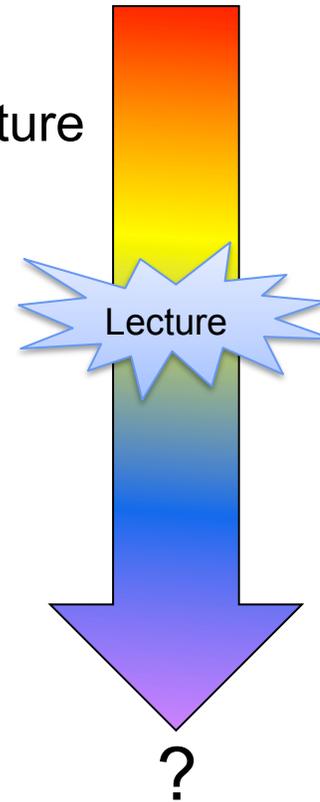


Assessment

- Assessment: Feedback to learners and instructors
- Formative assessment:
 - Students can keep track of their own learning
 - Students do not fall behind
 - Instructors keep track of their students' learning
 - can adapt the teaching to the learning
- Summative assessment: exams
 - Technology allows for frequent exams

Overview

- Pre-Class Questions
 - Students being prepared for lecture
 - Just-In-Time Teaching
- In-Class Questions
 - Clickers
- Post-Class Questions
 - Homework
 - Online Discussions, Helprooms
 - Exams
- Does this even work?
- *How is this realistically possible?*
- Write some questions



Pre-Class Questions

Students being prepared for
lecture

Just-In-Time Teaching

Pre-Class Questions

<http://physics.lite.msu.edu/>

Username: Your "Alias"

Password: purdue

Select: LB 272 – Intro Physics ...

Laurie Iten (No Role, Cumulat

Main Menu |

Menu » User Roles

Show all roles

User Role				
<input type="button" value="Select"/> Author				
<input type="button" value="Select"/> Course Coordinator	Your Test Course Syllabus			
	Domain:msu			
<input type="button" value="Select"/> Student	LB 272 - Intro Physics Lecture II Syllabus	Sun Jan 10 01:00:00 am 2010 (EST)	Fri Jul 9 11:00:00 pm 2010 (EDT)	
	Section: ADM			
<input type="button" value="Select"/>	lb330/492 Spring 2010 Syllabus	Mon Jan 11 01:00:00 am 2010 (EST)	Wed Jul 7 11:00:00 pm 2010 (EDT)	
	Section: purdue			
<input type="button" value="No role"/>				Currently selected.

Welcome to Lyman Briggs Physics

This machine is dedicated to courses offered by Lyman Briggs physics faculty.
For all other MSU courses, please go to <http://loncapa.msu.edu/>

This LON-CAPA server is version

[Logout](#) [Course/Community Catalog](#)

Pre-Class Questions

- Easy questions embedded into content
- Due before lecture

▼ Time-Varying Currents Materials		
• Introduction		
• RC Circuit		
• RC Circuit Example		
• Applet: RC Circuit with Battery		
• RL Circuit with Battery		
• RL Circuit with Battery Example		
• LC Circuit		
• LC Circuit with Battery Example	💬	
• LC Circuit Time Evolution		
• LC Time Evolution Example		
• DC RCL Circuit		
? DC Circuit Basics	💬 ✖	Answer available
• Alternating Currents and Voltages		
• Applet: Oscilloscope		
• AC Power Dissipation in a Resistor		
• AC Power Dissipation Example		
? RMS Current, Voltage, and Power	💬 ✖	Answer available
• Inductance in an AC Circuit		
• Inductance in AC Circuit Example		
? RL-Circuits	✖	Answer available
• Capacitor in an AC Circuit		

Pre-Class Questions

- Make sure students read materials
- Questions can be answered just based on the readings
- Students come prepared

Which of the following statements are true?

False: In a circuit consisting of an AC voltage source and a resistor, the dissipated power is proportional to the current.

True: In a circuit consisting of an AC voltage source and a resistor, the voltage drop across the resistor and the voltage source are in phase.

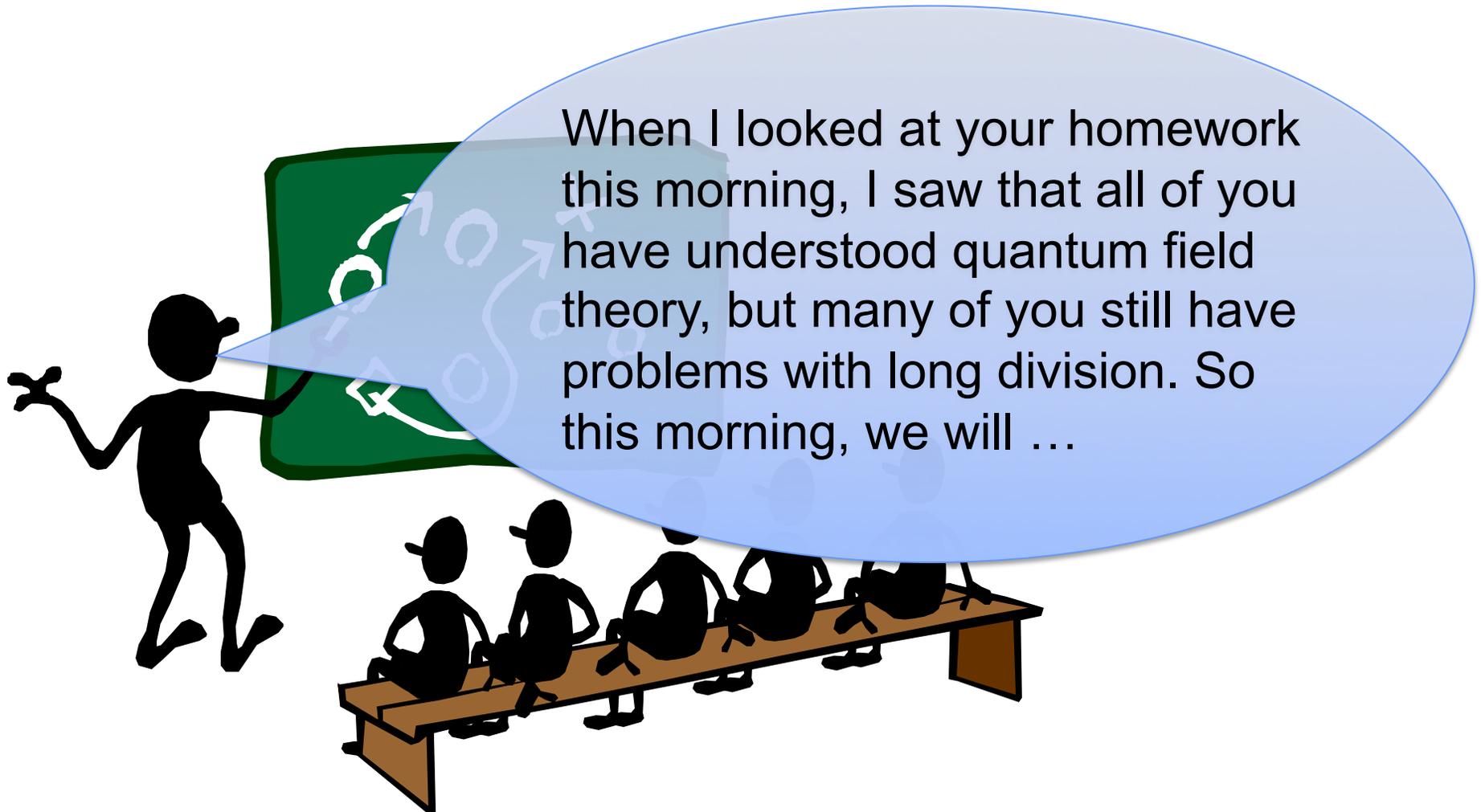
True: The rms-voltage is proportional to the maximum AC-voltage.

True: In a circuit with a capacitor and inductance in series (no resistance), if the capacitor is initially charged, an un-damped harmonic oscillation takes place.

Computer's answer now shown above. Tries 0/6

Just-In-Time

- Adapt lecture to student difficulties



Just-In-Time

Course Action Items

Gerd Kortemeyer
Course Coordinator
LBS 272 - Spring 2006

LBS 272 - Spring 2006 -> Display Action Items

What's New?

[Go to first resource](#)

Page set to be displayed after you have viewed the [What's New? page \(user preference\)](#) **Change** for just [this course](#) or for all [your courses](#).

[Hide all](#) [Show all](#)

Problems requiring handgrading [Hide](#)

Problem Name	Number ungraded
Electric Field	4

Problems with **Difficult problems** [Hide](#)

No problems with...

Problems with av. attempts ≥ 3 or deg. difficulty ≥ 0.8 and total number of students with submissions ≥ 4 [Hide](#)

[Change thresholds?](#)

Resource	Part Num.	Num. students	Av. Attempts	Deg. Diff	Last Reset	Reset Count?
Field Lines	single part	24	2.12	0.84		<input type="checkbox"/>
Net Force	single part	53	2.49	0.80		<input type="checkbox"/>
Pith Balls	single part	52	4.12	0.90		<input type="checkbox"/>

[Reset counters to 0](#)

Resources in course with version changes since last week [Hide](#)

[Change interval?](#)

Resource	Last revised	New version	Version used
Applet: Electron Orbit	Fri Jan 13 10:18:52 2006 (EST)	10	10
Capacitance of a Sphere	Mon Jan 16 12:03:13 2006	8	8

Discussions

Difficult problems

Unread course discussion posts [Hide](#)

[Change options?](#)

Location	Type	Time of last post	Number of new posts
Coulomb	Resource	last Monday, Jan 16 at 04:55 pm (EST)	1
Distance Change	Resource	last Monday, Jan 16 at 07:00 pm (EST)	1
Field Lines	Resource	last Monday, Jan 16 at 07:49 pm (EST)	1
Force	Resource	on Wednesday, Jan 11 at 07:01 pm (EST)	3
Net Force	Resource	23 hours, 19 minutes ago	5
Pith Balls	Resource	last Monday, Jan 16 at 09:21 pm (EST)	6
Point P	Resource	last Friday, Jan 13 at 02:34 pm (EST)	5
Potential	Resource	last Sunday, Jan 15 at 03:15 pm (EST)	1
Two Charges	Resource	last Sunday, Jan 15 at 03:26 pm (EST)	1
Vector	Resource	last Saturday, Jan 14 at 01:32 am (EST)	1
Vectors	Resource	last Saturday, Jan 14 at 12:09 pm (EST)	2

New course messages [Hide](#)

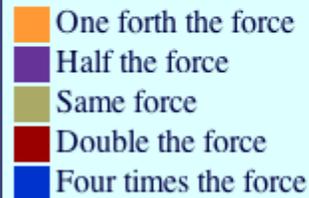
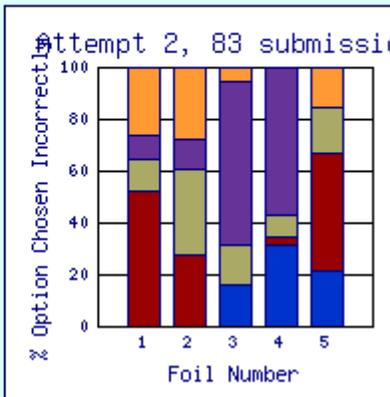
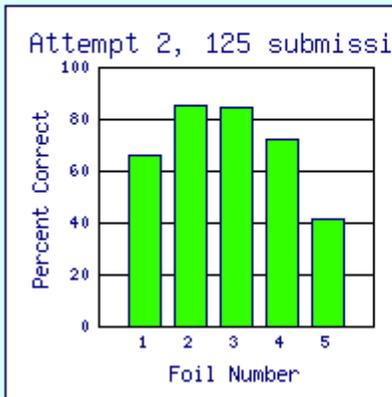
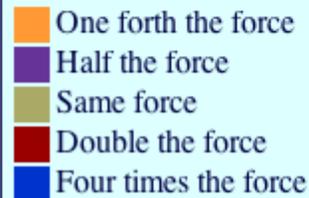
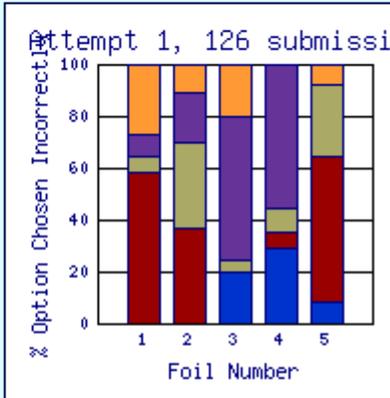
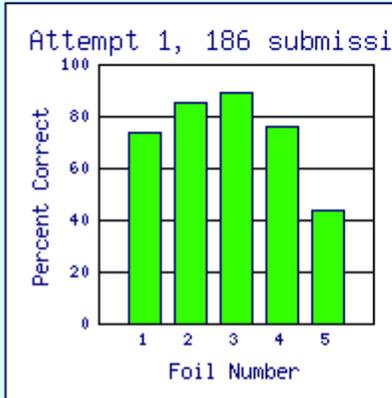
Number	Subject	Sender	Date/Time
1.	Feedback [msu/mmp/kap18/problems/cd460.problem]	@msu	Sat Jan 14 10:45:02 2006 (EST)

New critical messages in course [Hide](#)

No unread critical messages in course

Just-In-Time

Foil Number	Foil Name	Foil Text	Correct Value
1	1_6_1_1_2	The distance between the two charges is cut in half.	Four times the force
2	1_6_1_2_2	The magnitude of both charges is doubled.	Four times the force
3	1_6_1_3_2	The magnitude of one of the two charges is doubled.	Double the force
4	1_6_1_4_2	The distance between the charges is doubled.	One fourth the force
5	1_6_1_5_2	The charges are placed in a medium with a factor two higher permittivity.	Half the force



In-Class Questions

Clickers

Clickers

Doesn't he
get that we
don't get it?

Yawn!

That's clear
– no, wait ...

Looks like
everybody but me
understands this!

I wonder
what's for
lunch



Clickers

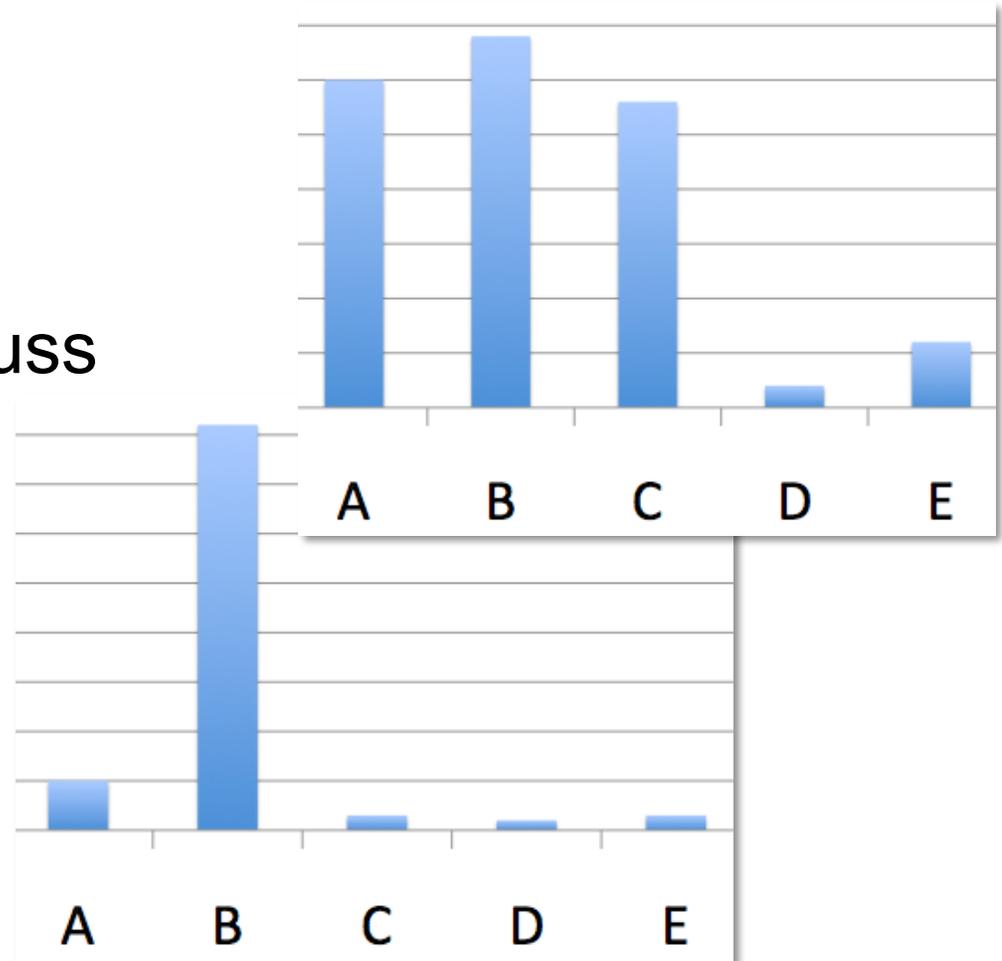
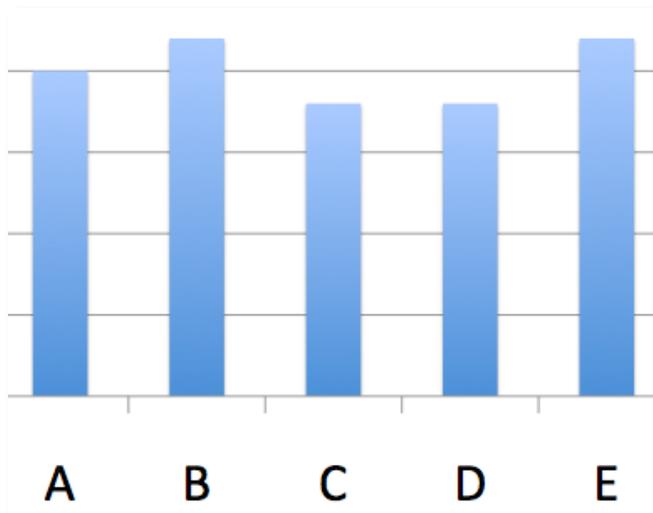
- RF devices
- One per student
- Students can answer questions during lecture



Clicker

Lecture progress depends on voting outcome

- Explain again
- Go on
- Let students discuss and vote again



Clicker

Peer-Instruction

- Students can sometimes explain concepts better than us to their peers
 - We have forgotten what we initially struggled with
- Students learn while explaining

Clicker

- Students register in LON-CAPA

The screenshot shows a web browser window titled "LON-CAPA Change Preferences" with the URL <http://phy1.lbs.msu.edu/adm/p>. The browser's address bar and search bar are visible. Below the browser, the LON-CAPA interface has a yellow background. At the top, there are navigation links: [Main Menu](#), [Launch Remote Control](#), [Roles](#), [Help](#), and [Exit](#). The main heading is "Change Preferences". On the right side, the user's name "Gerd The Kortemeyer" and role "No Role, Cumulative Privileges" are displayed. Below the heading, there is a breadcrumb trail: [Menu](#)->[Set User Preferences](#)->[Register Clicker](#). The primary action is "Change Preferences". A text prompt asks to "Enter response device ('clicker') numbers". A text input field contains the alphanumeric string "005BC59E". A "Register" button is located below the input field.

Clicker

- Give credit for correct and for incorrect answers

 [Main Menu](#) [Return to Last Location](#) [Navigate Contents](#)

Grading (msu_8p96131ebae7b47b8msul1 ss08lbs272)

Current Resource: Mon, Mar 10th

Part: 0 score Type: numerical

Specify a file containing the clicker information for this resource.

 MonMar10thA.csv

Type:

Award points just for participation

Correctness determined from response by course personnel

Correctness determined from response with clicker ID(s)

Percentage points for correct solution:

Percentage points for incorrect solution:

Post-Class Questions

Homework

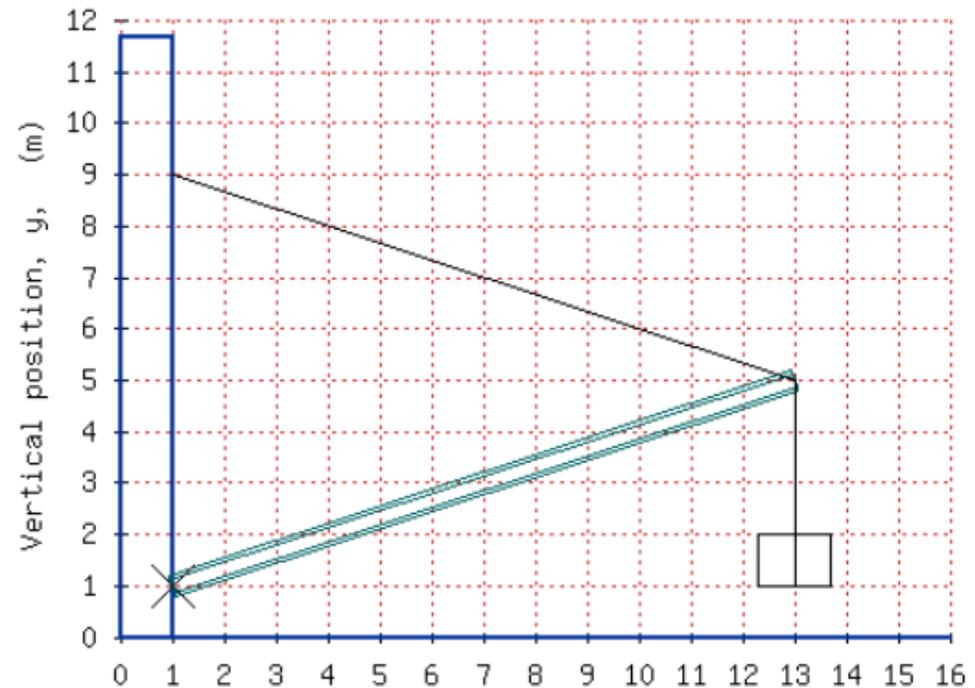
Helprooms

Exams

Homework

More sophisticated
highly
randomizing
problems

A crate with a mass of 155.5 kg is suspended from the end of a uniform boom with mass of 89.5 kg. The upper end of the boom is supported by a cable attached to the wall and the lower end by a pivot (marked X) on the same wall. Calculate the tension in the cable.



Homework

- ...special emphasis on math
 - including support of
 - LaTeX
 - Maxima
 - R

Give an example of a function

1. which is orthogonal to $6 \cdot \cos(7 \cdot x) - 2 \cdot \sin(2 \cdot x)$ with respect to the scalar product

$$\langle g | h \rangle = \frac{1}{\pi} \int_{-\pi}^{\pi} dx g(x) \cdot h(x)$$

2. whose norm is 1.

The function you have provided does not have a norm of one.

Incorrect. Tries 1

What is the derivative of

$$\begin{pmatrix} 4t^3 \\ 8t^8 \end{pmatrix}$$

with respect to t ?

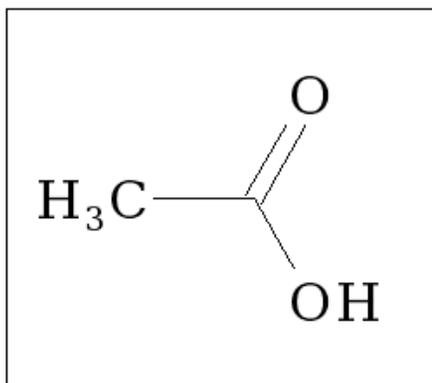
You need to multiply with the original exponent.

Incorrect. Tries 1

Homework

- ... chemistry ...

The image below is $C_2H_4O_2$

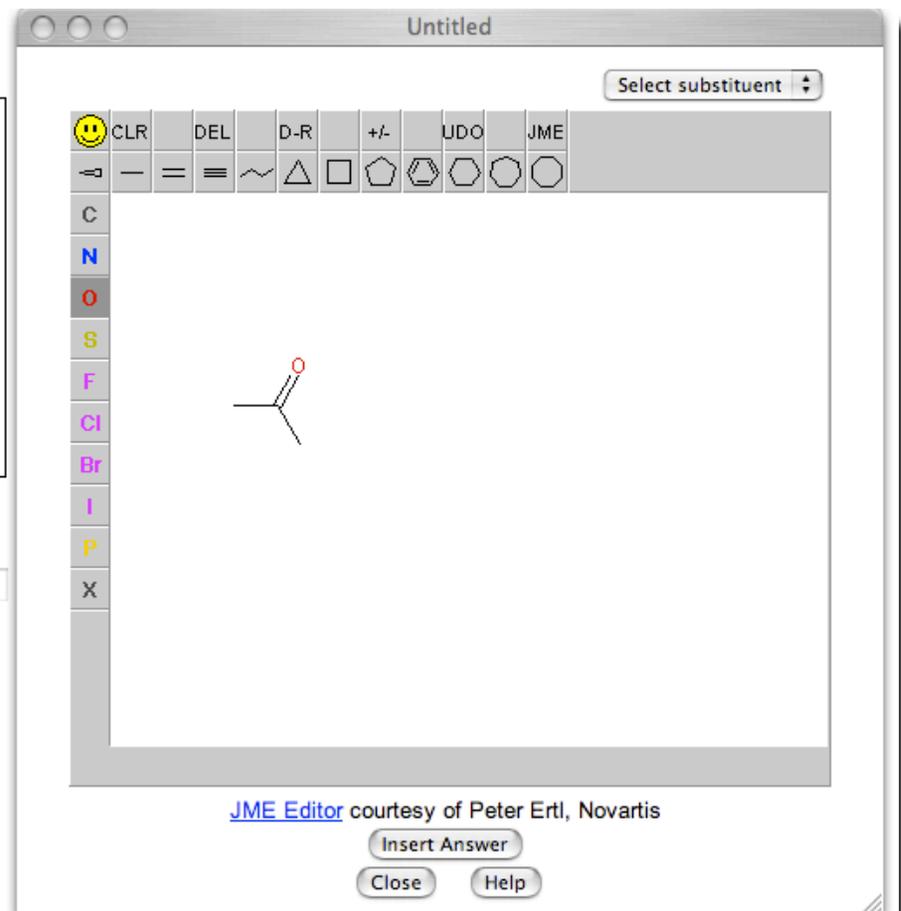


Draw acetic acid.

Draw Molecule

Submit Answer Tries 0/99

[Post Discussion](#)



The screenshot shows the JME Editor interface. The window title is "Untitled". The top toolbar includes buttons for CLR, DEL, D-R, +/-, LDO, and JME. Below the toolbar is a "Select substituent" dropdown menu. The main drawing area shows the chemical structure of acetic acid (CH₃COOH) being drawn. The left sidebar contains a vertical list of elements: C, N, O, S, F, Cl, Br, I, P, X. At the bottom of the window, there are buttons for "Insert Answer", "Close", and "Help".

JME Editor courtesy of Peter Ertl, Novartis

Homework

- ... physical units ...

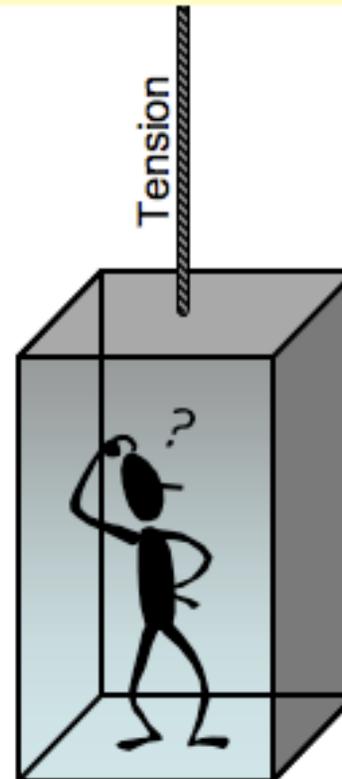
Elevator Problem

Due never

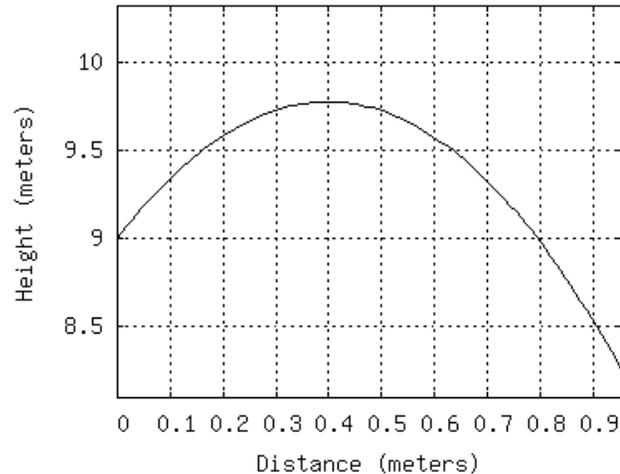
An elevator (cabin mass 500 kg) is designed for a maximum load of 2600 kg, and to reach a velocity of 3 m/s in 5 s. For this scenario, what is the tension the elevator rope has to withstand?

Submit Answer

Tries 0/99



Online Discussions



The plot shows the trajectory (height versus distance) of an object launched at an angle of 75.6 degrees. What was the initial speed of the object? **4.0 m/s**
Computer's answer now shown above. Tries 0/12

[Threaded View](#) [Chronological View](#) [Sorting/Filtering options](#) [Export?](#)

Anonymous 1 (Fri Sep 22 01:26:29 2006 (EDT))

any hints to start?

Re: *Anonymous 2* (Fri Sep 22 01:56:48 2006 (EDT))

You need to find the Y component of velocity... you can do this by finding the height traveled (notice it does not start on the ground) and combining that with acceleration in a kinematics equation. From there use trig to get the original velocity.

Re: Re: *Anonymous 1* (Fri Sep 22 12:10:37 2006 (EDT))

how can we find the height traveled and how can we get the acceleration if we don't have the time?

Anonymous 3 (Fri Sep 22 16:41:27 2006 (EDT))

i'm lost on this one... can anyone help?

Re: *Anonymous 4* (Fri Sep 22 20:02:45 2006 (EDT))

Use the squared kinematics equation - so $V_f^2 = V_i^2 + 2a(X_f - X_i)$.

Discussions

Encouraged, since all students have different versions.
Again: Peer-Instruction.

Helprooms

- Staffed with Learning Assistants in the evenings

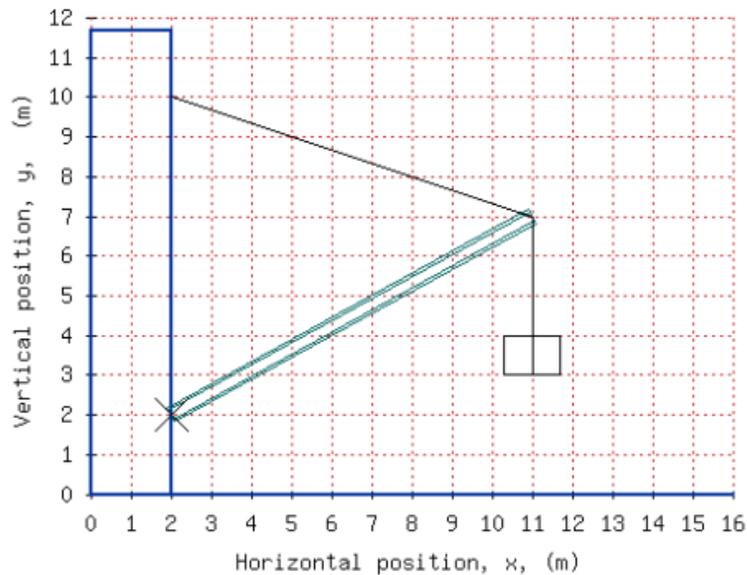


- Collaborative learning space, peer instruction

Exams

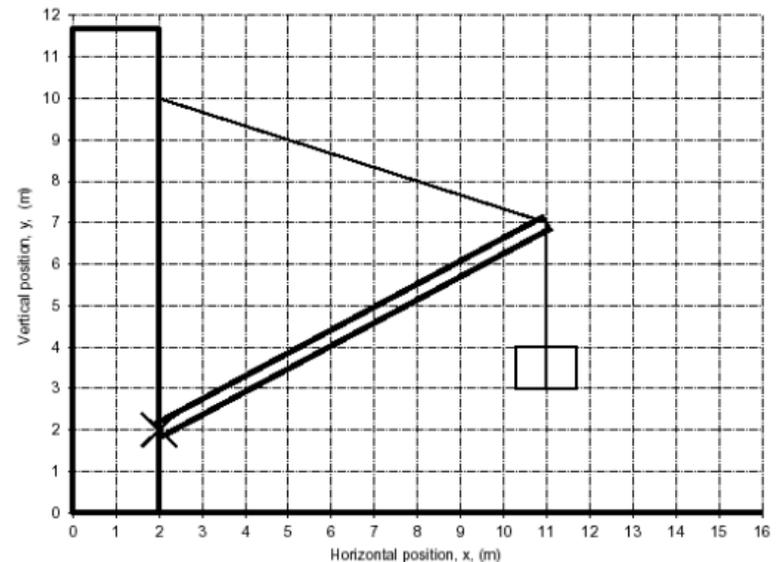
- Problems can also be rendered for bubble sheets
- Each student has a different exam

A crate with a mass of 177.5 kg is suspended from the end of a uniform boom with mass of 88.5 kg. The upper end of the boom is supported by a cable attached to the wall and the lower end by a pivot (marked X) on the same wall. Calculate the tension in the cable.



Submit Answer

1 pt A crate with a mass of 177.5 kg is suspended from the end of a uniform boom with mass of 88.5 kg. The upper end of the boom is supported by a cable attached to the wall and the lower end by a pivot (marked X) on the same wall. Calculate the tension in the cable.



(in N)

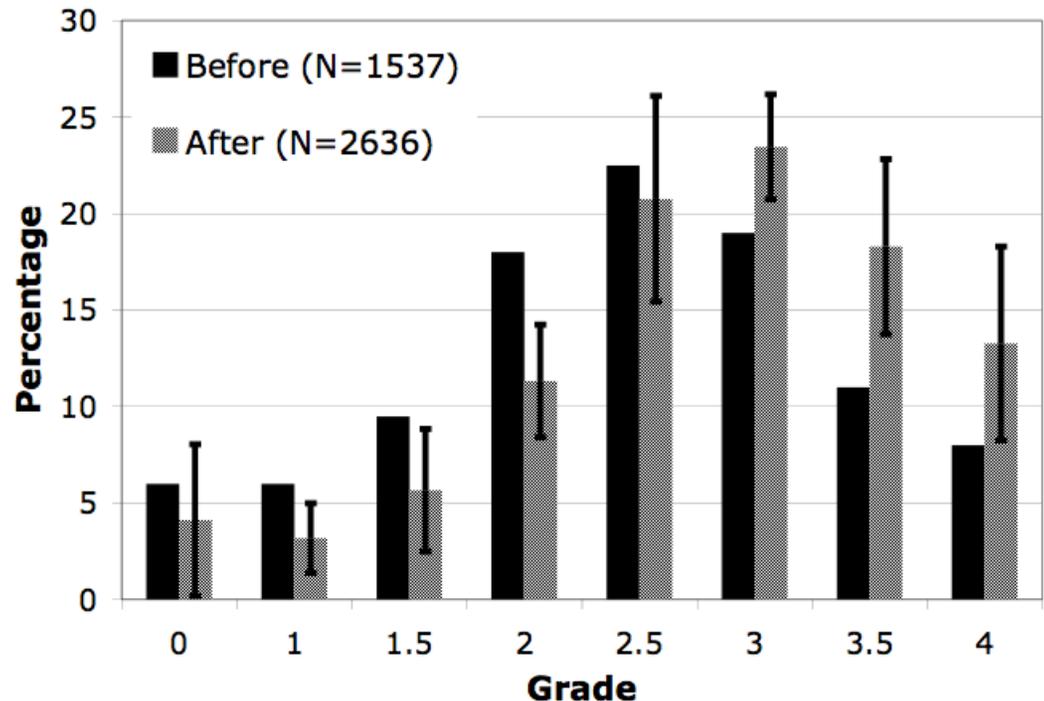
22. A 2.58×10^3 B 2.92×10^3 C 3.29×10^3
 D 3.72×10^3 E 4.21×10^3 F 4.75×10^3
 G 5.37×10^3 H 6.07×10^3

Before we go on ...

... does this even work?

Learning Success

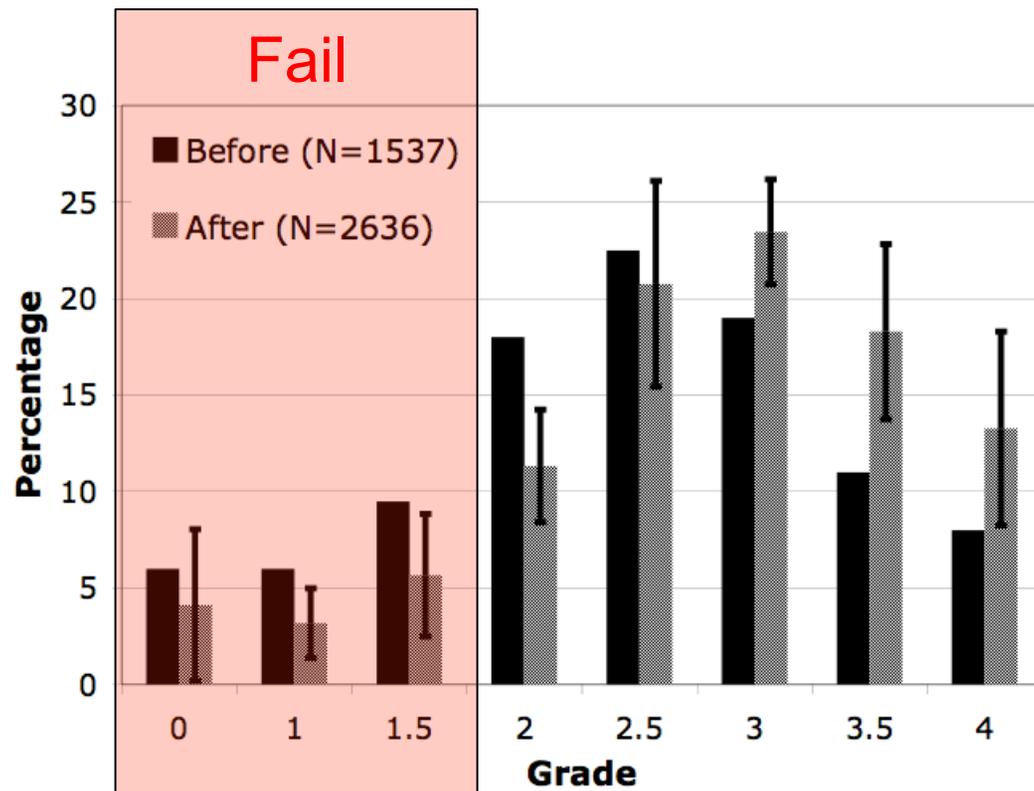
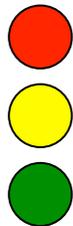
- Intro Physics for Scientists and Engineers
- Grades in years before and after online homework



Learning Success

Mostly helps students who are on the brink of failing the course.

Here at
Purdue:
“Signals”



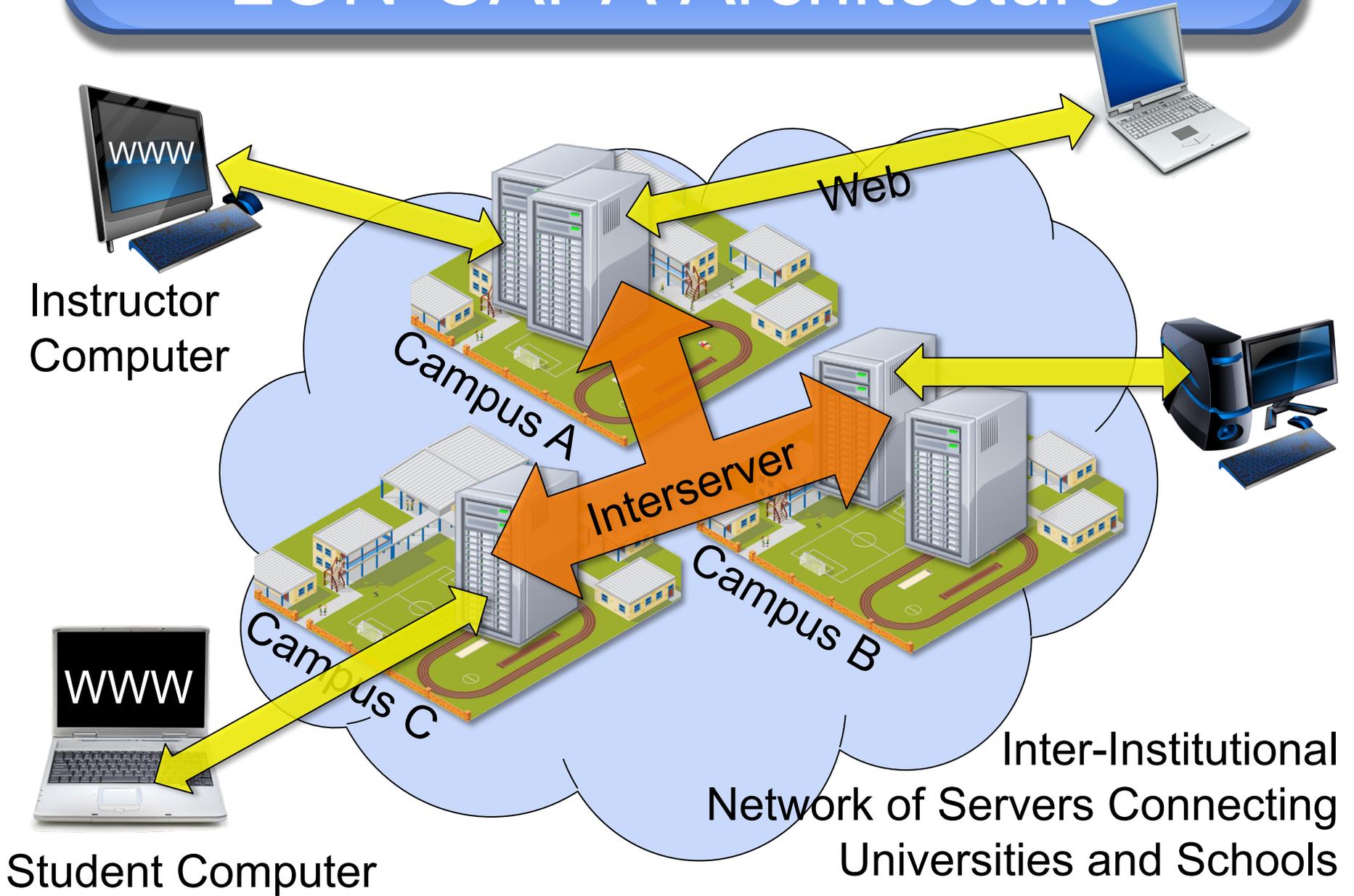
How is this realistically possible?

Sharing of Resources

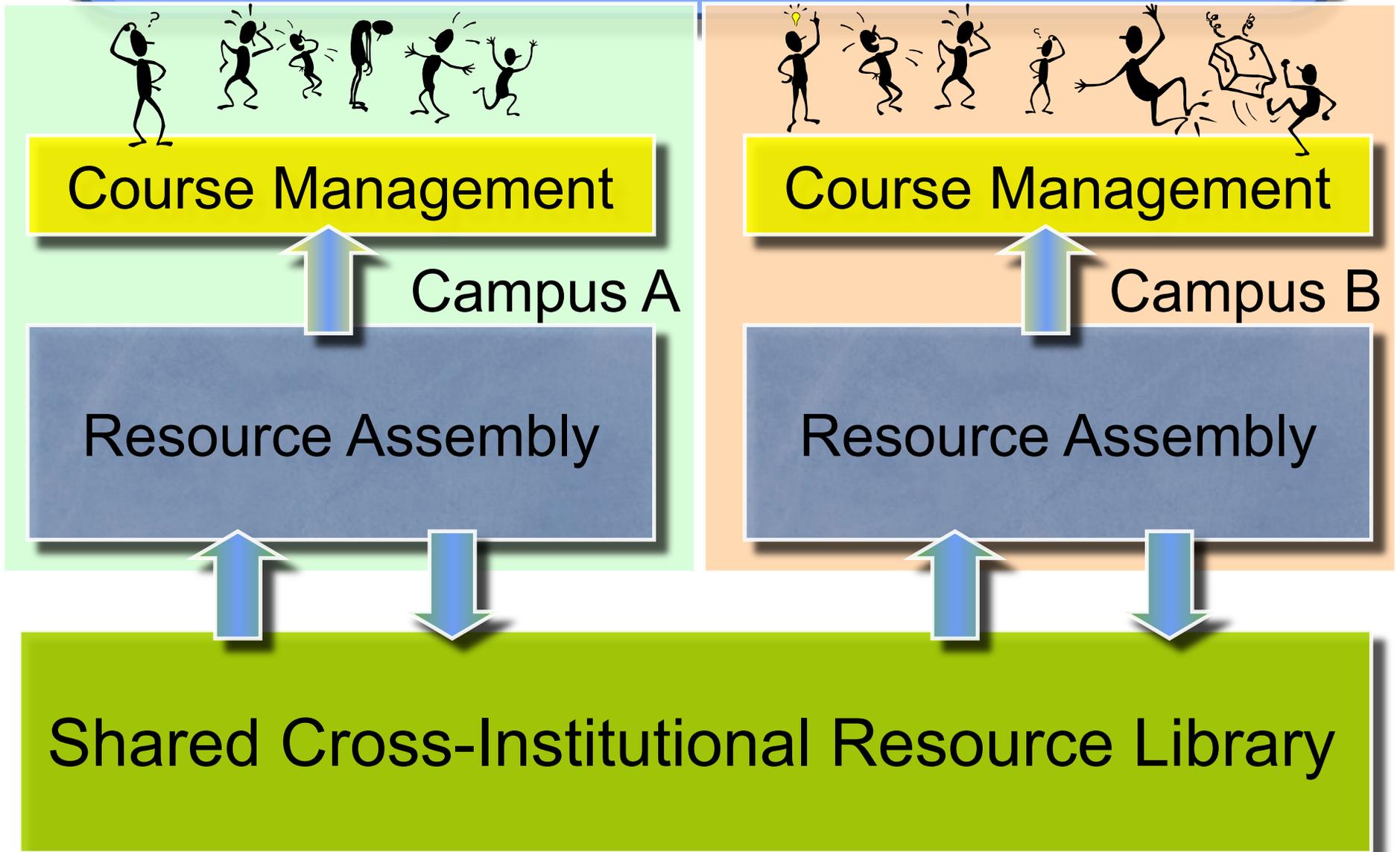
- Creating online resources is a lot of work
- Doing so for use in just one course is a waste of time and effort
- Many resources could be used among a number of courses and across institutions



LON-CAPA Architecture

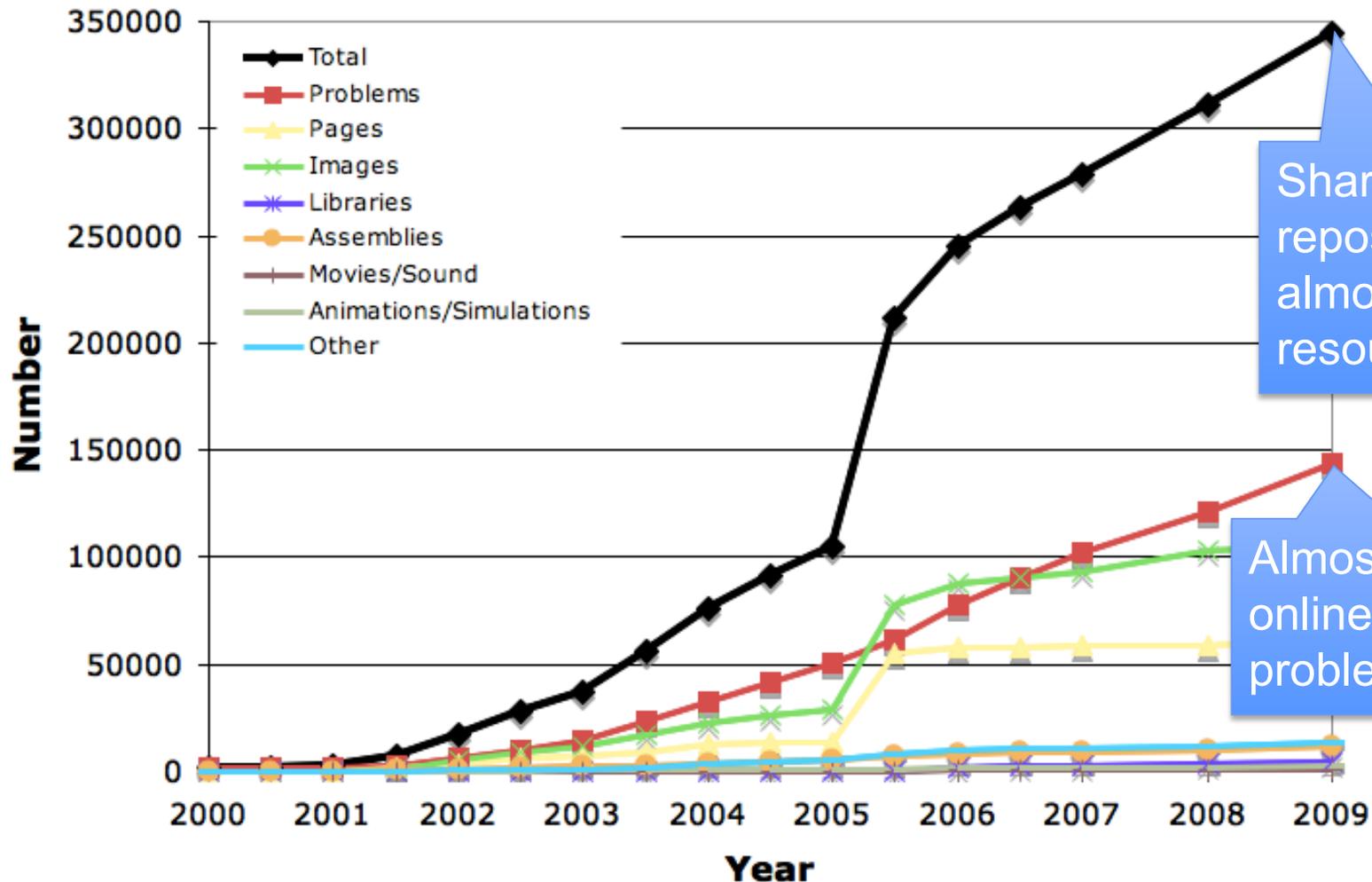


LON-CAPA Architecture



The LON-CAPA Community

LON-CAPA Shared Resource Pool



Shared content repository with almost 350,000 resources

Almost 150,000 online homework problems

Resource Assembly



Writes module about energy conservation



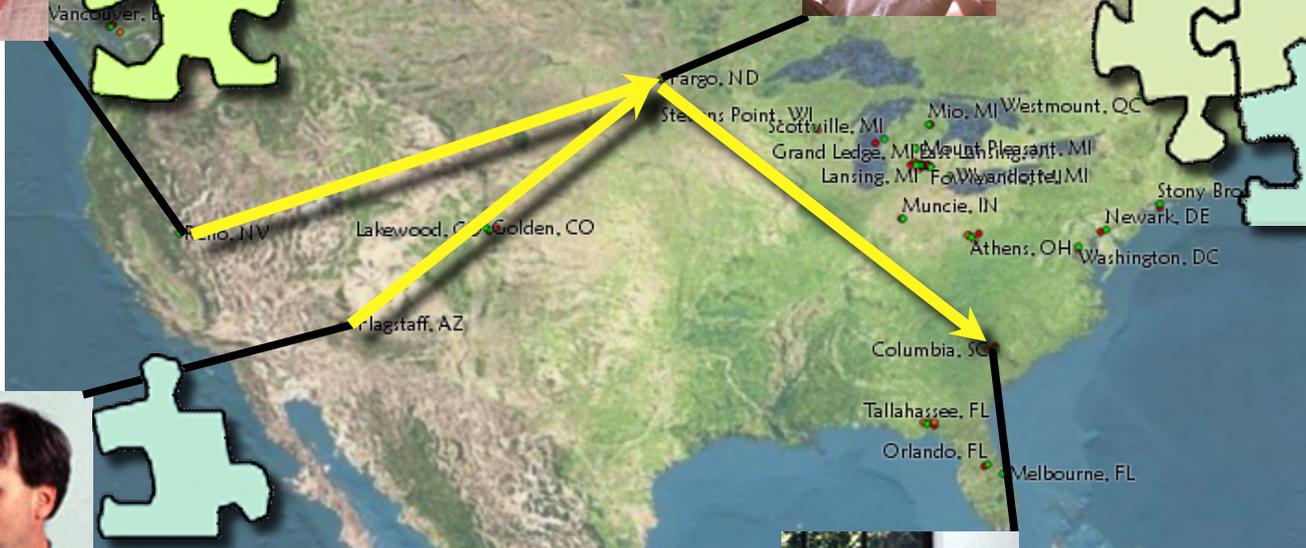
Compiles module about conservation laws



Writes module about momentum conservation

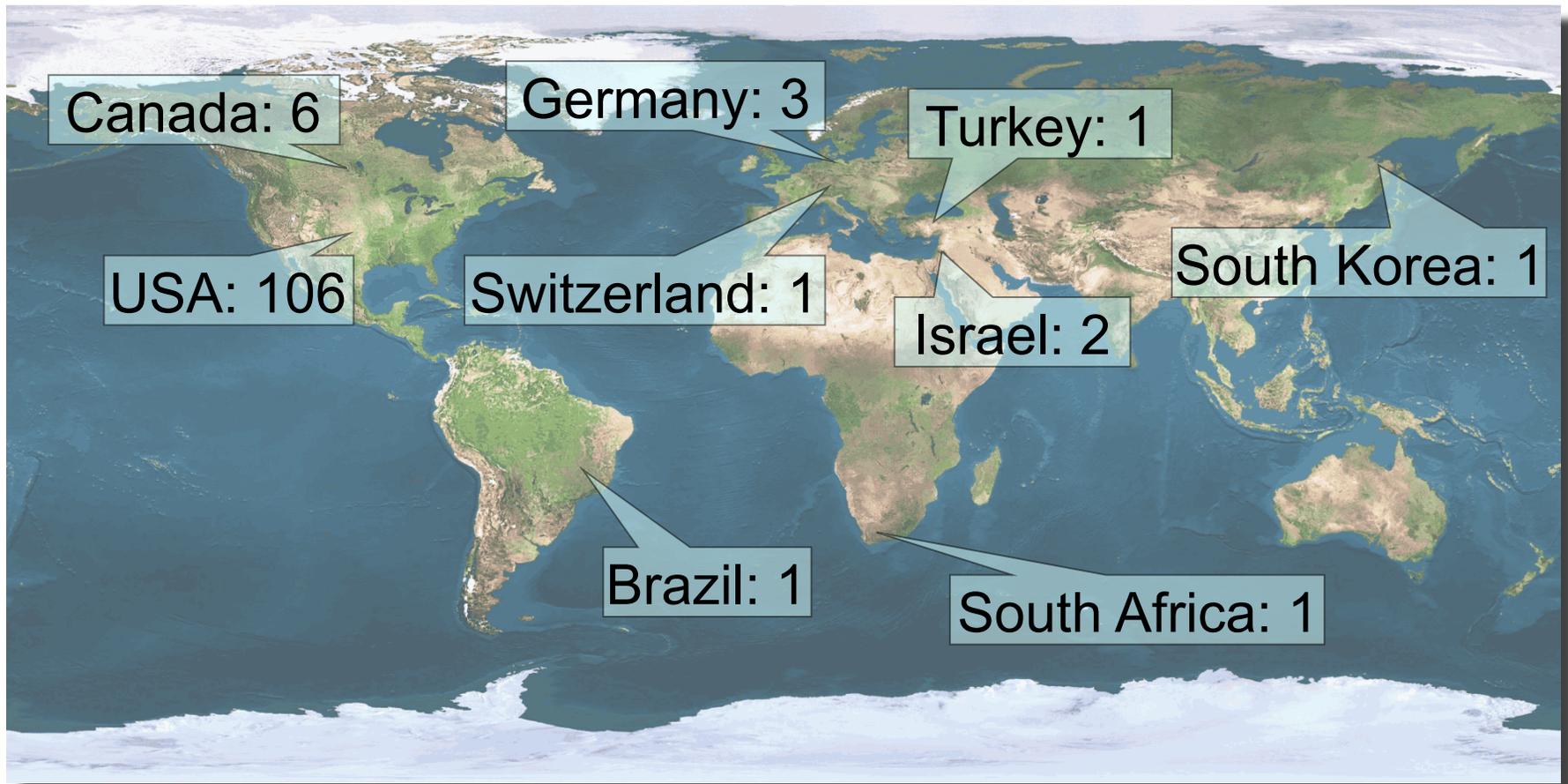


Uses whole assembly in his course



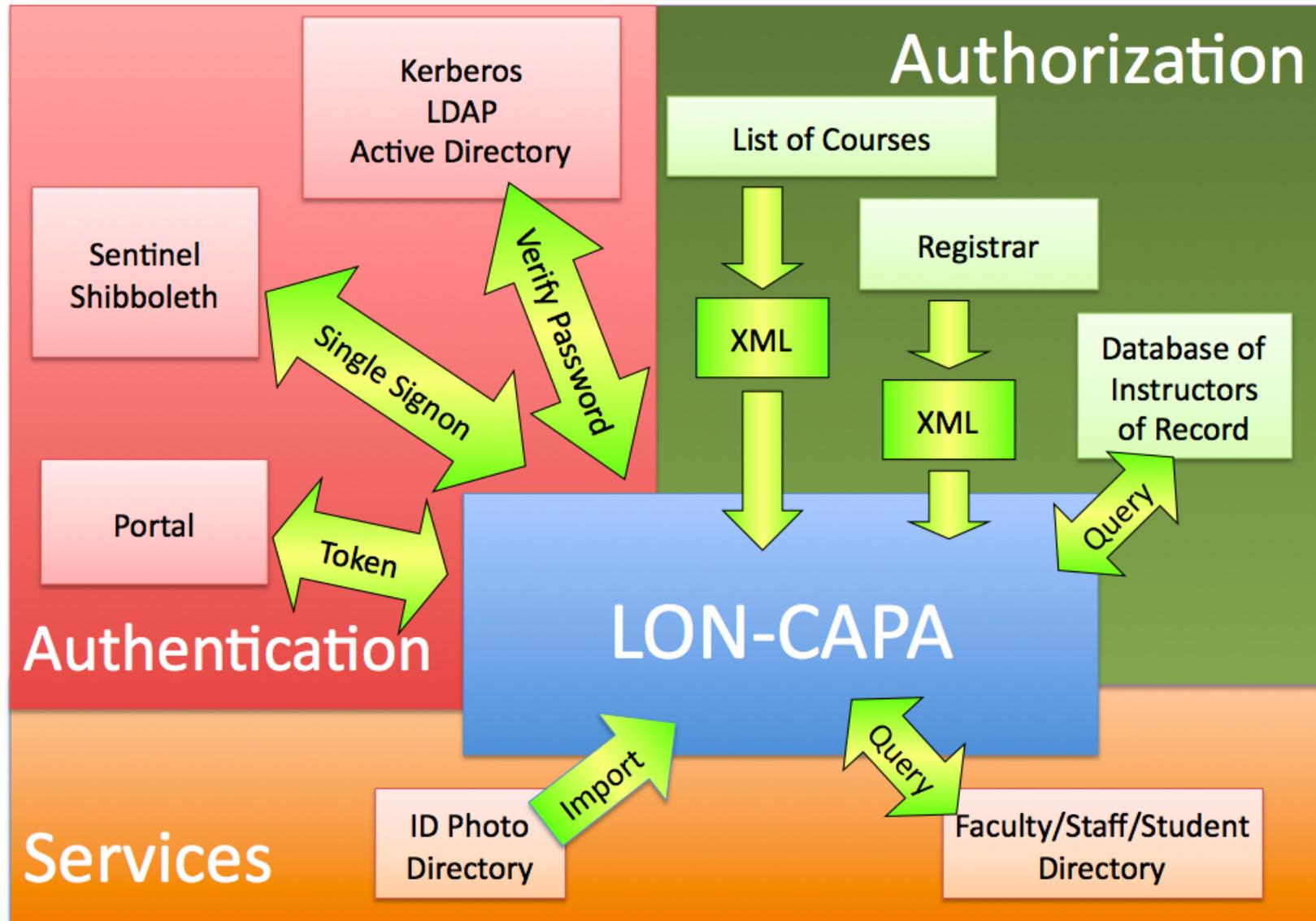
The LON-CAPA Community

High Schools, Colleges, and Universities



... plus grant projects and publishing companies.

Think Global, Act Local



Let's do some authoring!

Laurie Iten (No Role, Cumulative Privileges)

Main Menu |

Menu » **User Roles**

Show all roles



	User Role	Extent	Start	End
Construction Space				
<input type="button" value="Select"/>	Author	Domain: msu Server: templite24.lite.msu.edu	Tue May 4 07:28:51 pm 2010 (EDT)	Sun Oct 31 07:28:51 pm 2010 (EDT)
Course				
<input type="button" value="Select"/>	Course Coordinator	Your Test Course Syllabus Domain:msu		
<input type="button" value="Select"/>	Student	LB 272 - Intro Physics Lecture II Syllabus Section: ADM	Sun Jan 10 01:00:00 am 2010 (EST)	Fri Jul 9 11:00:00 pm 2010 (EDT)
<input type="button" value="Select"/>	Student	lb330/492 Spring 2010 Syllabus Section: purdue	Mon Jan 11 01:00:00 am 2010 (EST)	Wed Jul 7 11:00:00 pm 2010 (EDT)
<input type="checkbox"/>	No role specified			Currently selected.

Welcome to Lyman Briggs Physics

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For all other MSU courses, please go to <http://loncapa.msu.edu/>

This LON-CAPA server is version

[Logout](#) [Course/Community Catalog](#)

Thank you!

Gerd Kortemeyer

korte@lite.msu.edu

<http://www.lon-capa.org/>