

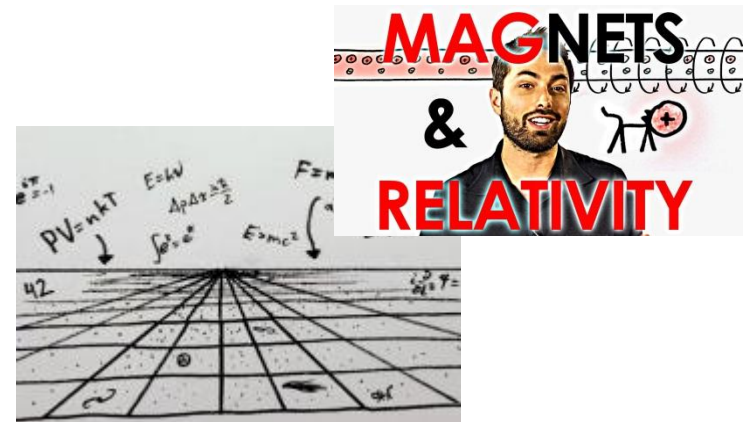
**Flipping a Biochemistry class for 500:
Videos, homework and pub quizzes**

The course

- Year 1 Sem. 2 Biochemistry – Introductory level
- Compulsory for most Life Sciences (~540/620)
- I volunteered to teach first 10 of 20 lectures
- After reality check, I flipped lectures 2, 3 and 4

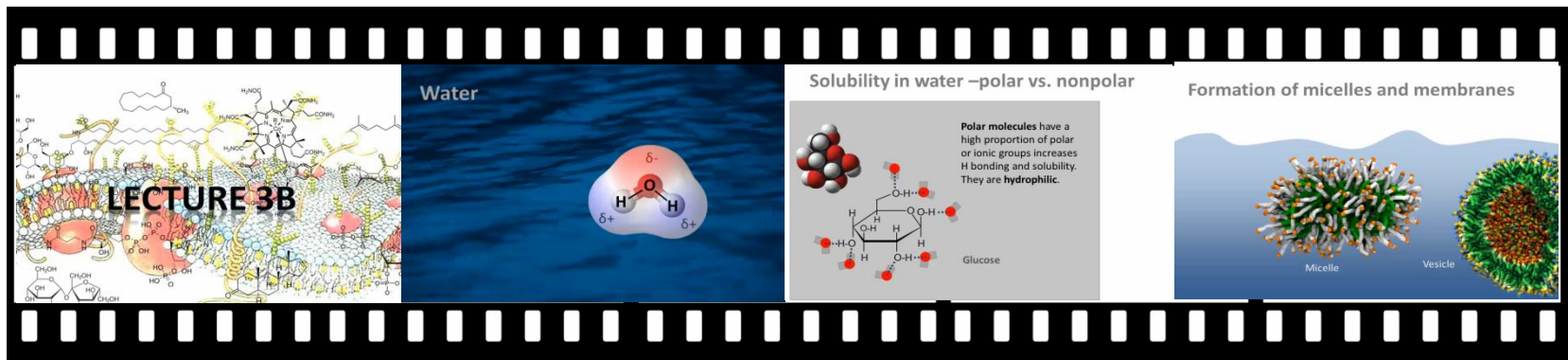
Motivation & inspiration

- Feedback from 12/13 Y1 personal advisees: Biochem could do with more variety, more exercises, more real-world material
- Classroom flipping presentations at HEA STEM '13
- Peer teaching (Eric Mazur)
- Youtube: Veritasium, Minutephysics



The idea – home study

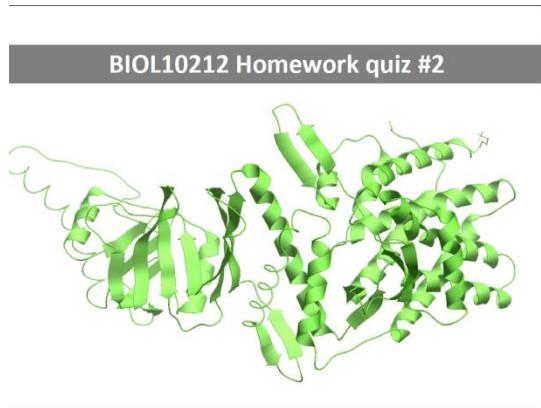
- For home study: 1 or 2 videos per lecture, 10-15 min, re-packaged lecture content



- Scripted, voice recorded with Audacity, Ppt screencapture with Snagit, edited with PPr 6
- Made available via UoM video library (link in BB) (one video problematic – uploaded as mp4 to BB)

The idea – homework

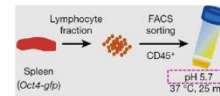
- Voluntary homework exercise



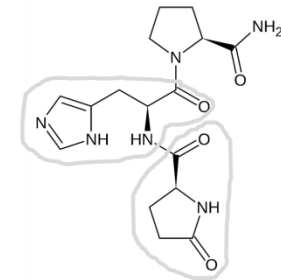
You want to make that pH 5.7 buffer with acetic acid and acetate. Assume a pKa for acetic acid of 4.7. If you make the buffer by mixing 20mM acetic acid and 20mM sodium acetate, what volumes do you use? Remember....

- A. Equal volumes of acetic acid and acetate.
- B. Ten times more acetate than acid.
- C. Ten times more acid than acetate
- D. Twice as much acetate than acid

$$\text{pH} = \text{pK}_a + \log_{10} \left(\frac{[\text{Ac}^-]}{[\text{HAc}]} \right)$$



This peptide contains proline (as amide)
Please circle it.



- Published via Nearpod (PIN available on BB)



The idea – “lecture slot”

- Discuss results from homework, explain tricky concepts

- Interactive “pub quiz”:
small group formation
& discussions
encouraged

BIOL10212 Pub Quiz #2

This is Manchester...

In severe metabolic acidosis, the blood pH can drop from a normal pH 7.4 to pH 7.1 (any lower and the condition is life threatening).

What change in $[H^+]$ concentration does that represent?

A. - 3%
B. + 0.05%
C. + 30%
D. - 50%

The plant growth hormone auxin (indole acetic acid) acts by polar transport through plant tissues.

In its protonated (= undissociated) form, but not as conjugate base, it is able to diffuse through lipid bilayers.

CC(=O)Oc1c[nH]c2ccccc12 pKa = 4.8

The technicalities

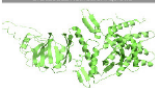
- Engagement with homework: **239, 146, 86** participants for quizzes #1, 2, 3 (Thu – Mon - Thu)
- Live session technically unproblematic; participant cap of 100 lifted to 200+ for sessions 2 & 3 (though stayed around 120)
- no time lost with downloading or voting

The technicalities

- Report from Nearpod:

Presentation: BIOL10212_homework02

 **Post Session Report**



Presentation
BIOL10212_homework02


Slides
20

Author
Thomas Nuhse


Teacher
Thomas Nuhse

Date
01/30


Time
00:52

 # of Students

146

 Student Participation

578/1022

 Quizzes

Correct Answers

310/1022

 **Student List**

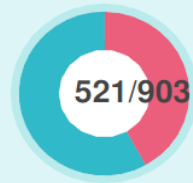
#	Nickname	ID	Poll	Open Ended	Quiz	Drawlt	#	Nickname	ID	Poll	Open Ended	Quiz	Drawlt
1	000 i like big buns		-	-	5/7	-	2	0316		-	-	2/7	-
3	1 #freenelsonmendela		-	-	1/7	-	4	1234		-	-	2/7	-
5	130295		-	-	5/7	-	6	1945		-	-	0/7	-
7	29	9003836	-	-	1/7	-	8	2ranma75		-	-	4/7	-
9	7961041		-	-	0/7	-	10	8394877		-	-	2/7	-
11	84066410		-	-	2/7	-	12	8410589		-	-	4/7	-

01/25/2014	Chris.RW		Two phosphoester linkages, an acyl anhydride and an amide.	●
01/25/2014	Cicely	9027107	One carboxyl ester, a phosphodiester and an amine.	●
01/25/2014	Claire	8995087	Three ester linkages, an acetate group and an amide.	●
01/25/2014	Coryn	mfbx2cbk	One carboxyl ester, a phosphodiester and an amine.	●
01/25/2014	D		One ester, two phosphoanhydride bonds and an amine.	●
01/25/2014	D			●
01/25/2014	Dan	8931194	One carboxyl ester, a phosphodiester and an amine.	●
01/25/2014	Dan Jones	8386526	One carboxyl ester, a phosphodiester and an amine.	●
01/25/2014	Daniel Green		One carboxyl ester, a phosphodiester and an amine.	●
01/25/2014	Danielle		One carboxyl ester, a phosphodiester and an amine.	●
01/25/2014	David	9087897	One carboxyl ester, a phosphodiester and an amine.	●
01/25/2014	Daya		One carboxyl ester, a phosphodiester and an amine.	●
01/25/2014	denise	9111334		●
01/25/2014	Dika	8987443	One carboxyl ester, a phosphodiester and an amine.	●
01/25/2014	Duckers61			●
01/25/2014	Ebrima	mfbx2ej6	One carboxyl ester, a phosphodiester and an amine.	●
01/25/2014	Ed			●
01/25/2014	Ed		One carboxyl ester, a phosphodiester and an amine.	●
01/25/2014	Eleanor		One carboxyl ester, a phosphodiester and an amine.	●
01/25/2014	Elizabeth	8930380	One ester, two phosphoanhydride bonds and an amine.	●
01/25/2014	ella			●
01/25/2014	Ella		Two phosphoester linkages, an acyl anhydride and an amide.	●
01/25/2014	em		One carboxyl ester, a phosphodiester and an amine.	●
01/25/2014	Emily		One ester, two phosphoanhydride bonds and an amine.	●
01/25/2014	Emily		One carboxyl ester, a phosphodiester and an amine.	●

of Students

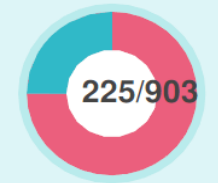


Student Participation



Quizzes

Correct Answers



Student List

#	Nickname	ID	Poll	Open Ended	Quiz	Drawlt	#	Nickname	ID	Poll	Open Ended	Quiz	Drawlt
1	1		-	-	2/7	-	2	1!		-	-	3/7	-
3	11 #freenelsonmandela #n everonatuesday		-	-	4/7	-	4	1234		-	-	2/7	-
5	123456789		-	-	3/7	-	6	1Pussypatrol		-	-	2/7	-
7	2-1 stoke		-	-	0/7	-	8	69		-	-	1/7	-
9	888		-	-	2/7	-	10	8939843		-	-	4/7	-
11	9099768		-	-	0/7	-	12	A	Mfbx2ln6	-	-	1/7	-
13	A		-	-	1/7	-	14	A		-	-	3/7	-
15	A -TEAM-892		-	-	1/7	-	16	A a a a a ;)	8939377	-	-	1/7	-
17	A happy seahawk		-	-	1/7	-	18	A Lucy spours		-	-	5/7	-
19	a wang		-	-	1/7	-	20	A wonderful student Sarah lambert		-	-	1/7	-
21	Aaa joe marley		-	-	0/7	-	22	aaaaaaaaa		-	-	1/7	-
23	Adam LurveShack		-	-	1/7	-	24	Add me on Grindr		-	-	4/7	-
25	Afp		-	-	1/7	-	26	ajdidjdjdjd		-	-	2/7	-
27	Alan		-	-	4/7	-	28	Amazingggg biochems		-	-	3/7	-
29	Annabel savage		-	-	1/7	-	30	ARAWRBOOBYBOOBY		-	-	4/7	-
31	Arpita's dragons		-	-	3/7	-	32	asdf		-	-	3/7	-
33	Asdfghjkl		-	-	1/7	-	34	asexual		-	-	1/7	-
35	Beach model godzilla	Spoidermen	-	-	2/7	-	36	Ben	8980057	-	-	4/7	-
37	bethany	9022298	-	-	3/7	-	38	Biochemwoo		-	-	2/7	-
39	Biotech		-	-	4/7	-	40	Blah		-	-	0/7	-
41	Breaking Nuhse		-	-	4/7	-	42	bukem	9113680	-	-	0/7	-
43	Cakewalk		-	-	5/7	-	44	chem		-	-	2/7	-
45	devooon		-	-	3/7	-	46	Dika	8987443	-	-	0/7	-

The technicalities

- Report from Nearpod:

Presentation: BIOL10212_homewor

85 Vsen

Draw it This hormone co

Date Nickname

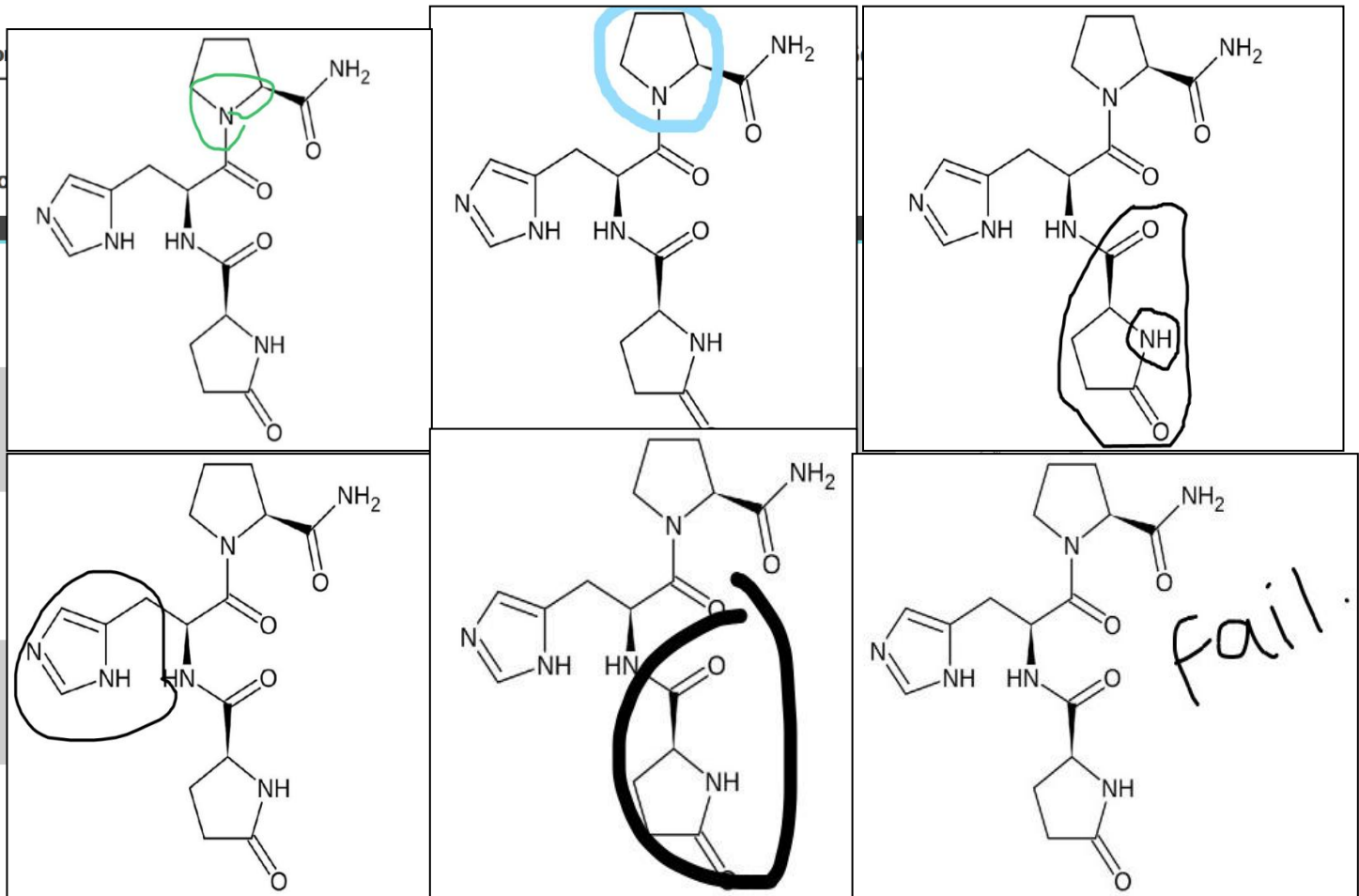
02/04/2014 ..

02/04/2014 130295

02/04/2014 2ranma75

02/04/2014 7965789

02/04/2014 8412783





What did the students think?



▶ Biol10212



2 February at 17:00 near Manchester 🌐

I like the idea of lecture flipping but I'm not convinced it worked in such a large group or at the start of a new topic that we have very little understanding of. I also think that I didn't gain as much from the lecture as I would have done in the normal time slot, when the idea was to actually learn more.

So, good idea but didn't work as well as I'd have hoped as I don't feel I learnt the content as well as I usually would have.

0% 25% 50% 75% 100%



It was fun to try something new.

N=93

Conclusions

- On the whole, students liked the flipping concept but it needs tweaking.
- Preparing videos and exercises is *a lot* of work but rewarding.
- Interactive pub quizzes are chaotic but good fun.
- Technology is no problem at all (thanks to Ian Miller for working behind the scenes!)
- Students need a little more structure; not all of the lecture should be quiz. More discipline during pub quiz needed (hard to resume after “chat period”)

Next time...

- Roll out videos and homework exercises to more lectures
- More complementary learning materials, better organised
- Cover homework quiz results only as part of a short lecture
- Possibly interactive pub quizzes for all lectures but only in the last 10-15 min