Happy
CANADA
Day

a place of mind

THE UNIVERSITY OF BRITISH COLUMBIA

PeerWise Participation

Supporting students in a multiple choice environment

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Effective Learning in the Biosciences
Edinburgh, U.K. 2011

Biology 112: Unicellular Life

The principles of cellular and molecular biology using mainly bacterial examples.

Course topics:

- Bacterial cell structure and function
- Genetics
- Metabolism

Enrolment:

- 6 lecture sections of 280 students (3 per term).
- Two terms of 800 students per term.

Biology 112: Unicellular Life

Course Structure

Grading:

- Exams = 80% of the grade [2 midterms,1 final exam]
- Participation marks = 20% of the grade.
- Exams consist of multiple choice questions.

Participation marks :

Pre-class reading assignments quizzes	Online
Group writing activities [Inventions & Investigations]	In class
"Thinking questions" by i►clicker	In class
PeerWise website-student authored questions	Online

What is PeerWise?

"PeerWise supports students in the creation, sharing, evaluation and discussion of assessment questions."

- Create, answer and comment on multiple choice questions.
- Creates a database of questions for the course.
- Learn by answering other questions and providing feedback.
- Freely available through University of Auckland, New Zealand
- Easy set up, accessibility for instructors and students.

http://peerwise.cs.auckland.ac.nz/
Contact: Paul Denny , Dept of Computer Sciences

Why Use PeerWise?

For Students

- Writing & evaluating questions promotes deep, reflective thinking.
- Actively contributing to their learning outside class.
- Easily accessible.

For Instructors

- Facilitates learning activities for large number of students.
- Minimal set up and administration.
- Easy data collection & marking for participation.
- Great ideas for exams questions.

How did we use PeerWise in 2010 - 2011?

Prior to an exam, students had to:

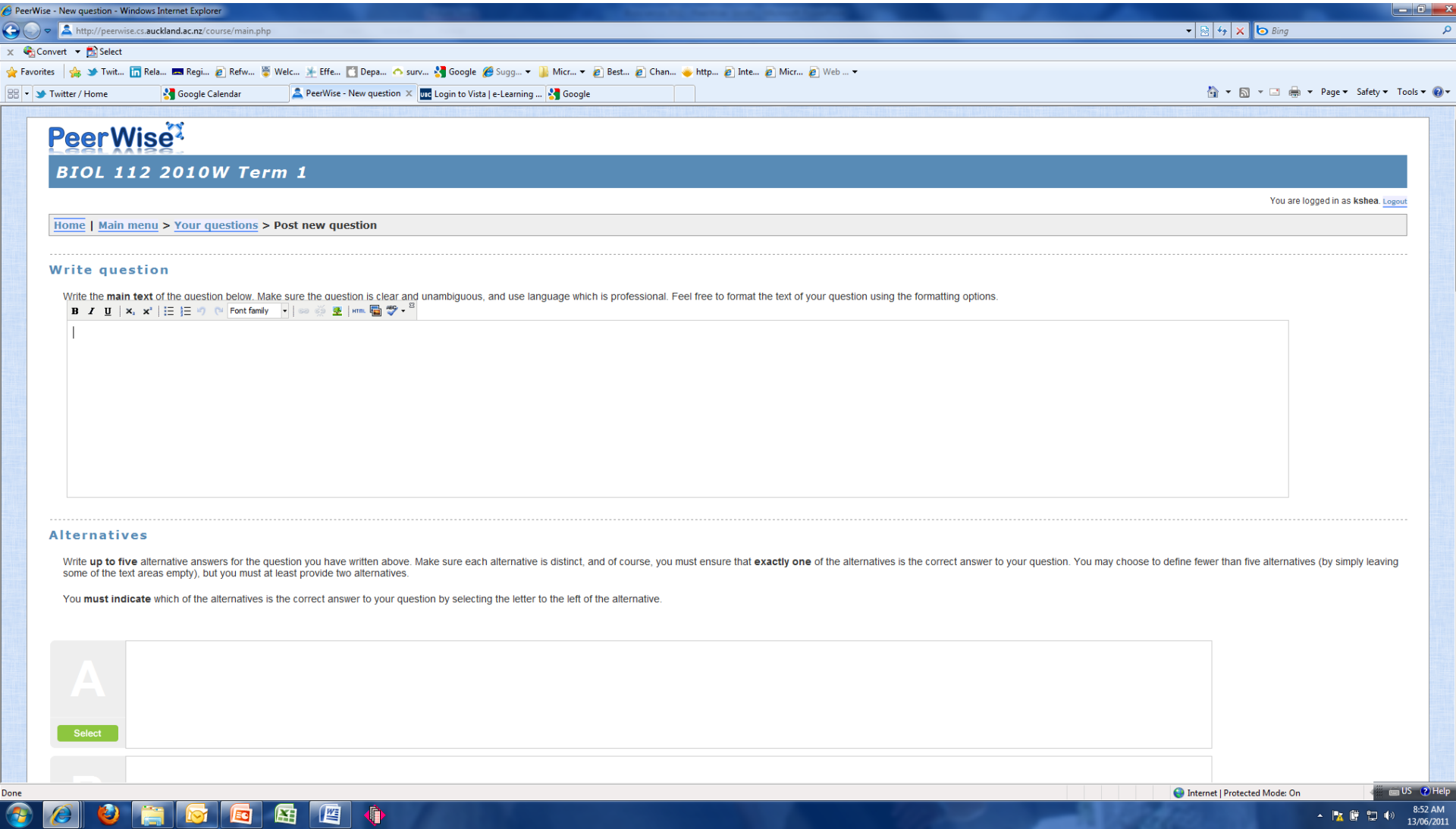
- Create 1 multiple choice question.
- Answer and provide feedback on 2 multiple choice questions created by other students.
- Repeated 3 times in a term for each exam.

Grading:

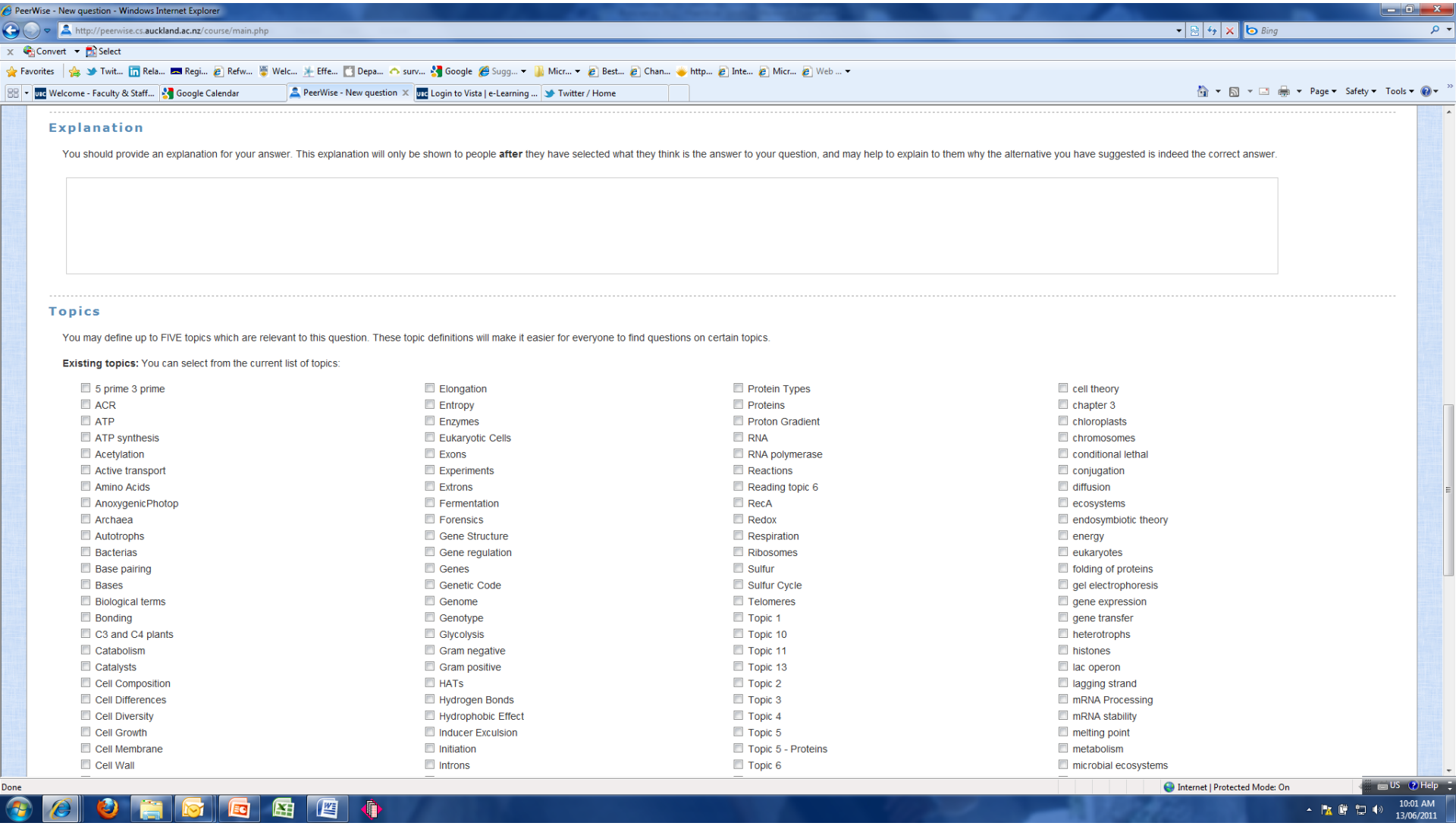
= 3% of their total grade:

- For each exam =0.5% for creating 1 question, 0.5% for answering 2 questions.
- No extra points for creating or answering more questions.

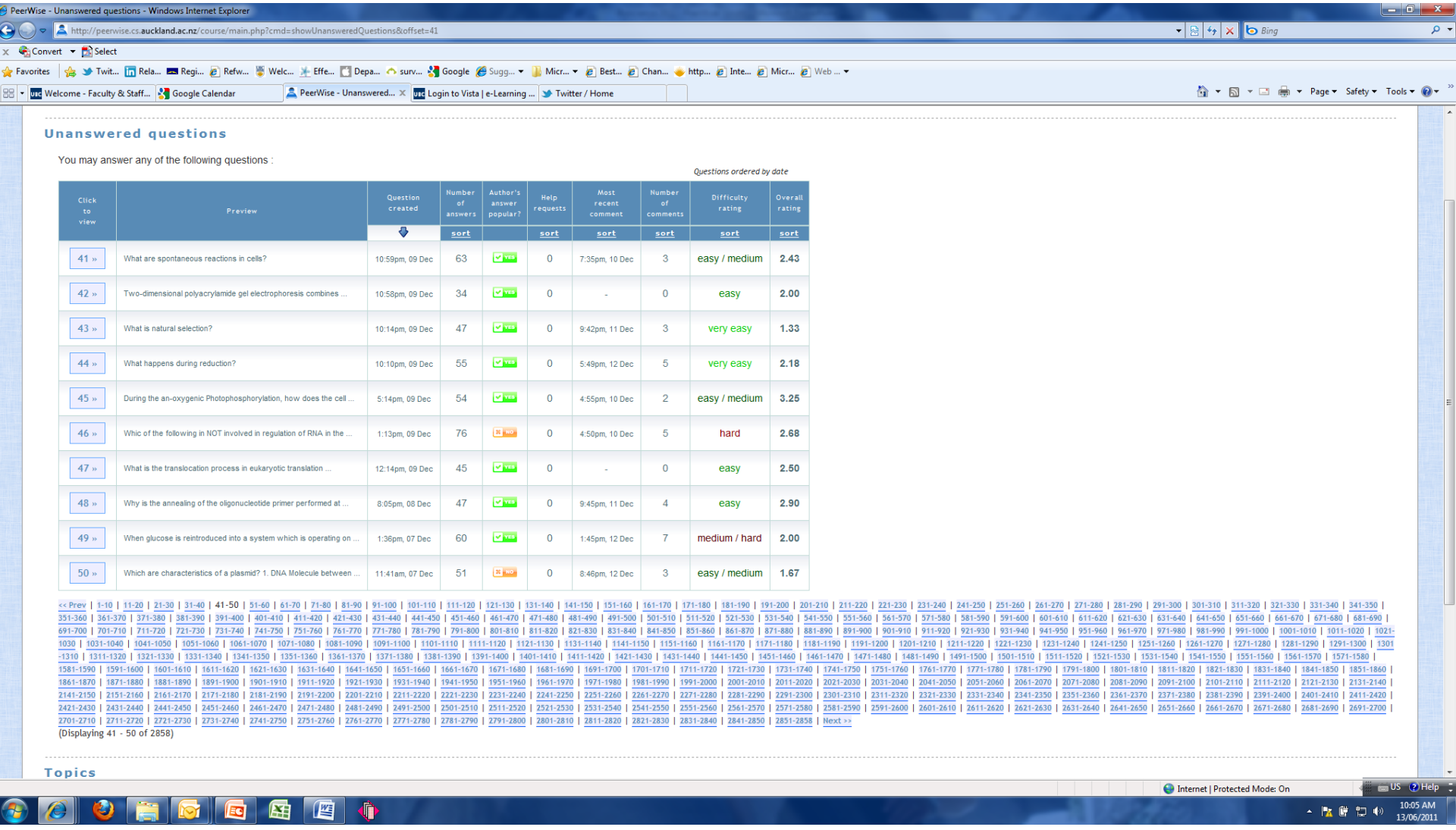
Writing Questions



Question Topics



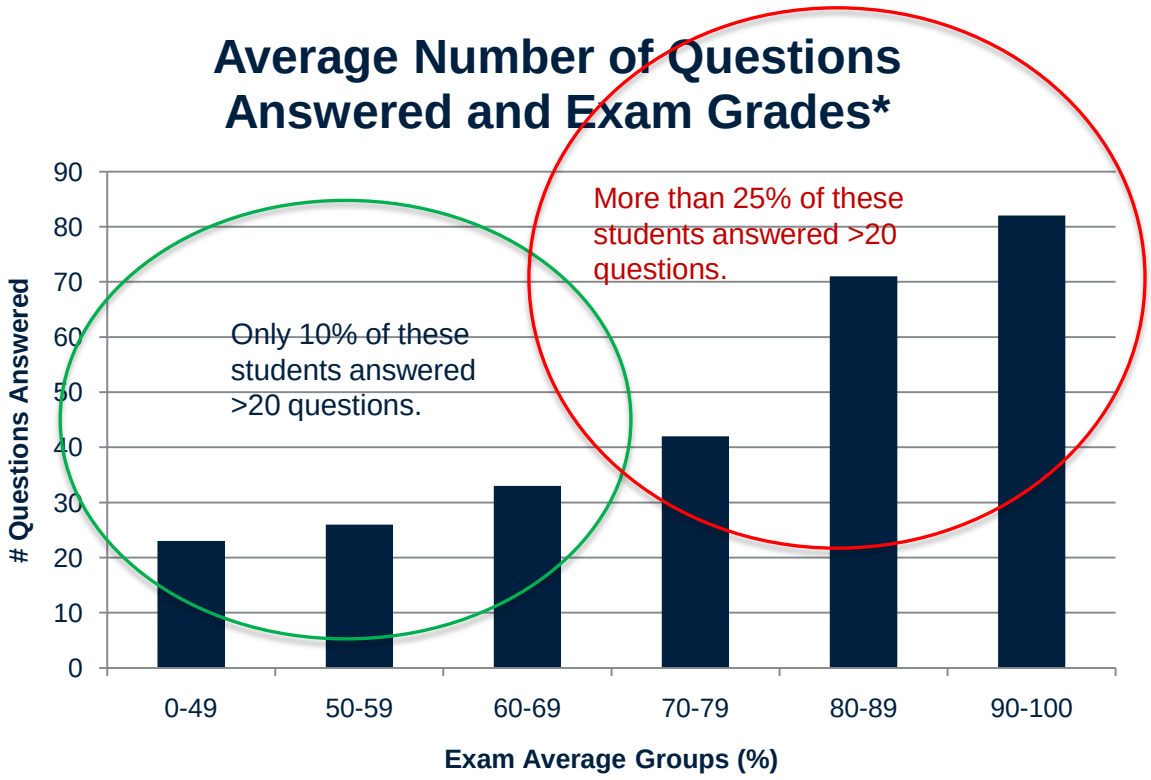
Answering Questions



Question Data

Click to view	Preview	Question created sort	Number of answers sort	Author's answer popular?	Help requests sort	Most recent comment sort	Number of comments sort	Difficulty rating	Overall rating sort
44 »	Given the following statements about oxygenic photophosphorylation, which are true?	9:18pm, 29 Nov	24	YES		4:22pm, 012 Dec	4	medium / hard	**2.78**
590 »	Which answer is not a function or a type of RNA?	4:36pm, 23 Sep	18	NO		0-	0	easy / medium	**1.8**
1185 »	Which mutation is expected to have the largest effect?	3:26pm, 03 Dec	10	YES		0-	0	easy	**3.5**

Winter Session 2010 - Terms 1 & 2



*Class exam average = 67%

Results from Combined Terms – Questions Answered

# PeerWise Questions Answered	Exam Average[2] (%)	% of Class
1- 20[1]	65	60
21-50	68	18

[1] minimum requirement for full participation marks = 2
[2] exam averages $p<0.01$

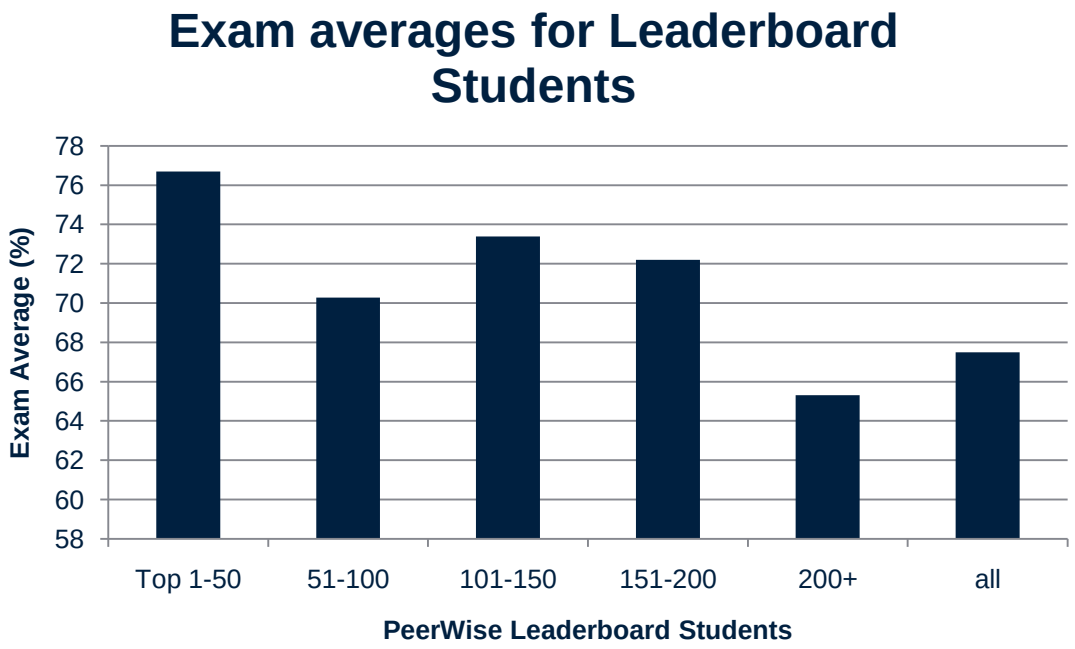
PeerWise Leaderboards

Student scores calculated by an algorithm based on:

- question authoring.
- question answering.
- question ratings by other students.

Highest scores of all students in this course		
Rank	User	Total score (components)
1	churros	5397 (87q, 9140a, 1524r)
2	predilection	4624 (432q, 3334a, 177r)
3	dl	4332 (174q, 3356a, 291r)

PeerWise Leaderboards



	Statistic[a]	Probability
One-way ANOVA	F(4,709)=16.76	p<0.001
Contrasts [a]:		
“1-50” to "51-100”	t(709)=2.60	p<0.01
“1-50” to “101-150”	t(709)=1.36	p>0.05
“1-50” to “151-200”	t(709)=1.84	p>0.05
“1-50” to “200+”	t(709)=6.28	p<0.01
“51-100” to “101-150”	t(709)=1.27	p>0.05
“51-100” to “151-200”	t(709)=0.785	p>0.05
“51-100” to “200+"	t(709)=2.71	p<0.001
“101-150” to “151-200"	t(709)=0.49	p>0.05
“101-150” to “200+"	t(709)=4.54	p<0.001
“151-200” to “200+"	t(709)=0.3.84	p<0.001
[a] contrast tests assumed equal variances		

PeerWise Leaderboards Results

Students Ratings	Exam Averages*	
	Term 1	Term 2
Top 200 students	71	73
All other students	65	65

*$p<0.01$

Some Interesting Numbers

Out of >2800 questions posted:

- 20 = % of questions were rated as medium difficulty or higher.
- 4 = highest question rating out 5 – very few examples!
- 200 or less = # of students answering any one question.
- 10 = % of students authored greater than required number of questions (3).
- 85 = % of the class answered between 1 -100 questions.

Other Challenges and Comments

- Reviewing or marking questions not feasible in large course however our Teaching Assistants can scanned database periodically.
- Encourage students to challenge themselves and others - students felt many of the questions were too "easy".
- Provide a schedule and keep it simple.
- Balance activities with structure and free-form to encourage voluntary participation among students.
- Provide guidelines for writing multiple choice questions e.g. on learning management system.

Acknowledgements

Many thanks to…

Biology 112 Team

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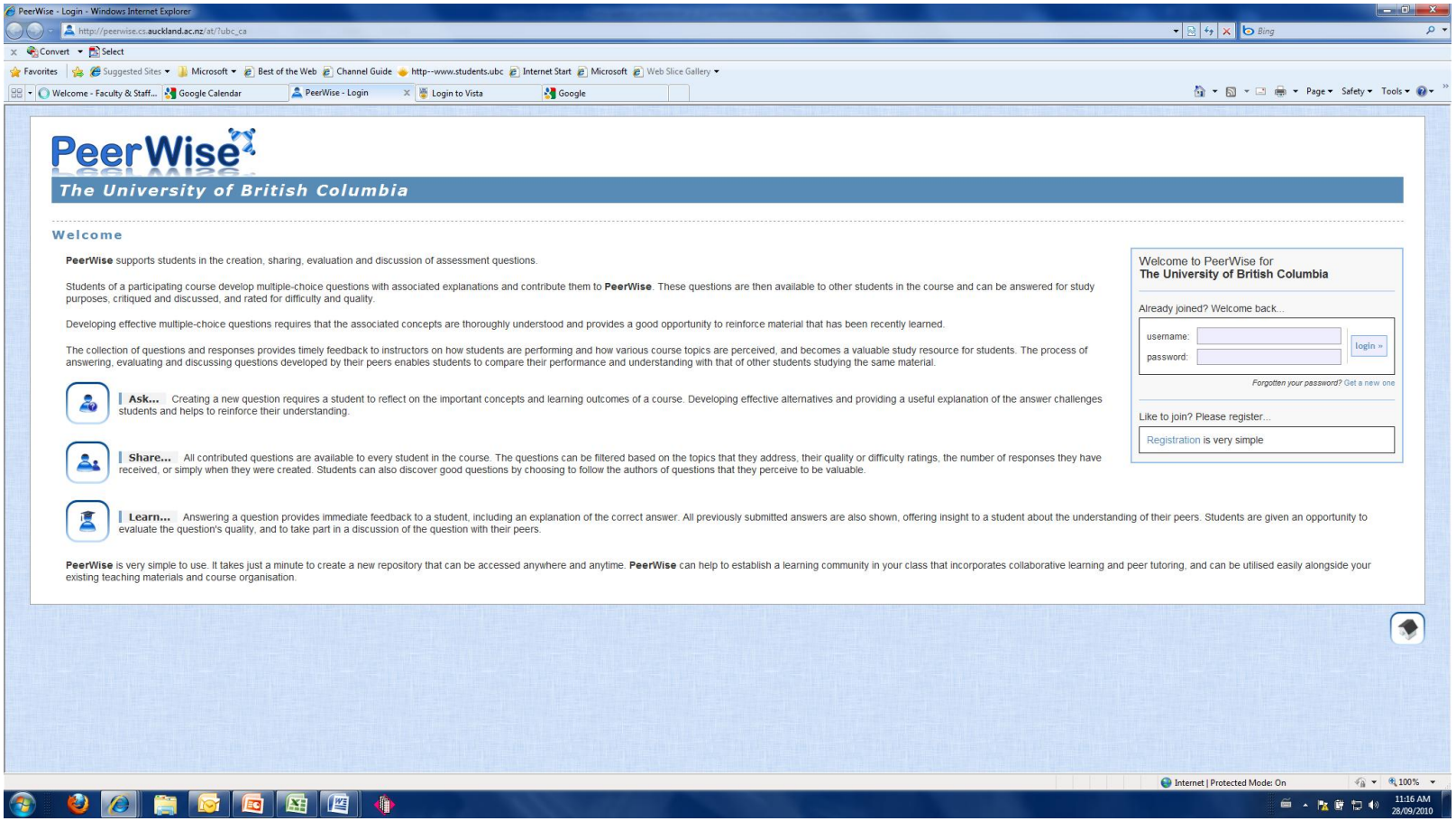
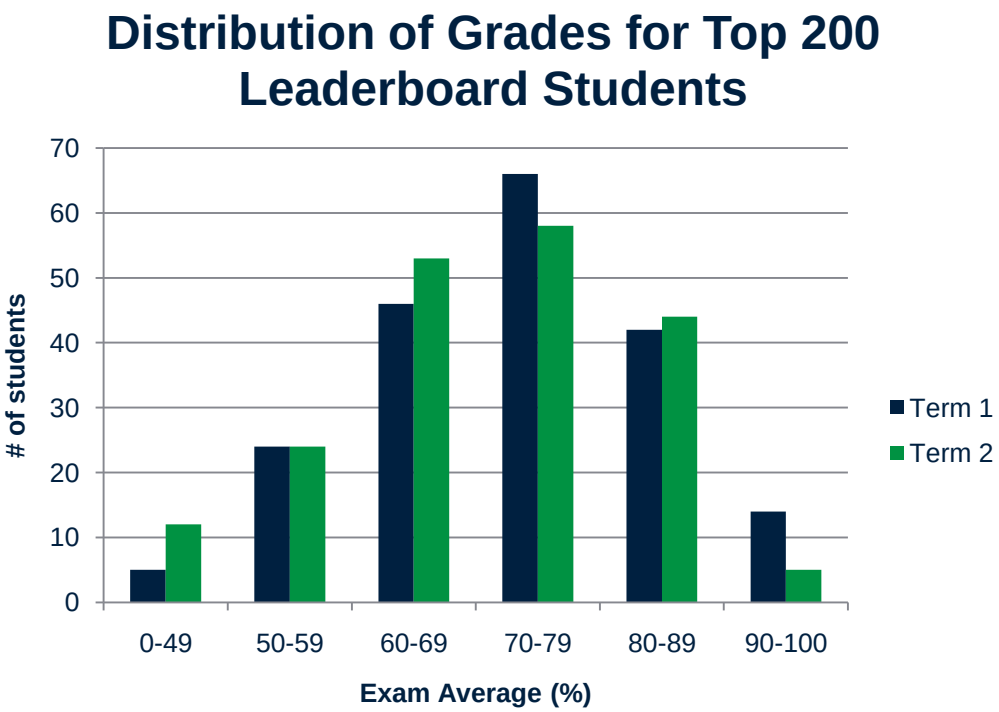
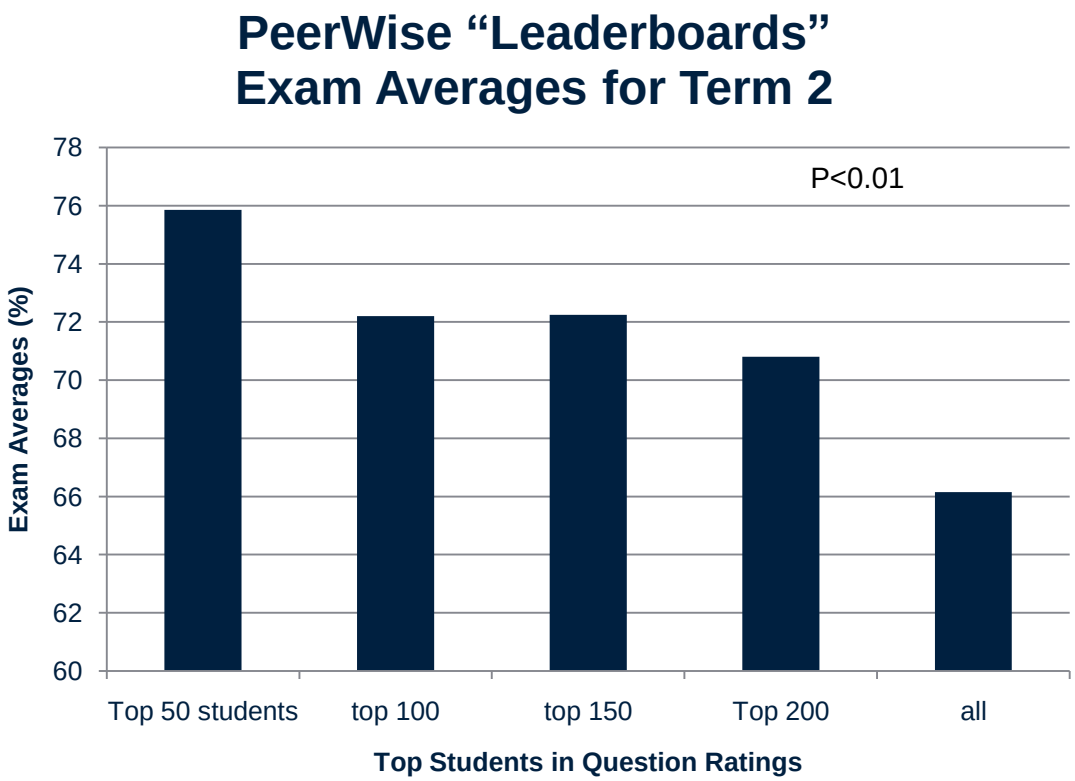
Marlo Firme
Liz Imrie
Jasmine Yadana

PeerWise

http://peerwise.cs.auckland.ac.nz/




Distribution of Grades for Top 200 Leaderboard Students
70
60
50
40
30
20
10
0
# of students
0-49
50-59
60-69
70-79
80-89
90-100
Exam Average (%)
Term 1
Term 2

Leaderboard Data