

Facilitating collaboration in an online introductory astronomy laboratory

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Link to presentation:
<http://goo.gl/aAOLAE>

Outline for my presentation

- Forming groups
- Making and sharing templates
 - Everything is stored on my Google Drive
- Typical lab activity
- Peer assessment tool and method
- Plusses and minuses

Forming groups

- Heterogeneous by ability. Based on...
- Astronomy concept test score
- Week 1 HW scores
- First lab score, done individually
- 3-4 people/group

The screenshot shows a web browser window with the URL `session.masteringastronomy.com/myct/itemView?assignmentProblemID=9273011`. The page title is "PHYS 101 Introductory Astronomy I at CWU". The user is signed in as "Bruce Palmquist, Instructor". The assignment is titled "Ranking Task: Lunar Phases II" and is part of "Cb2 Understanding the Six Learnings". The item type is "Tutorial", difficulty is "3", time is "7m", and it has "Learning Outcomes" and "Contact the Publisher" links. The task is labeled "Part A" and includes the following text: "The following figures show a top view of Earth, sunlight, and six different positions of the Moon as it orbits Earth. Note that the distances shown are not drawn to scale. Rank each of the six lunar positions from left to right based on the amount of the Moon's illuminated surface that is visible from Earth, from greatest to least. (If two diagrams have an equal amount of illumination as seen from Earth, put one on top of the other.)". Below the text are six diagrams showing Earth and the Moon in various orbital positions relative to the Sun (Sunlight).

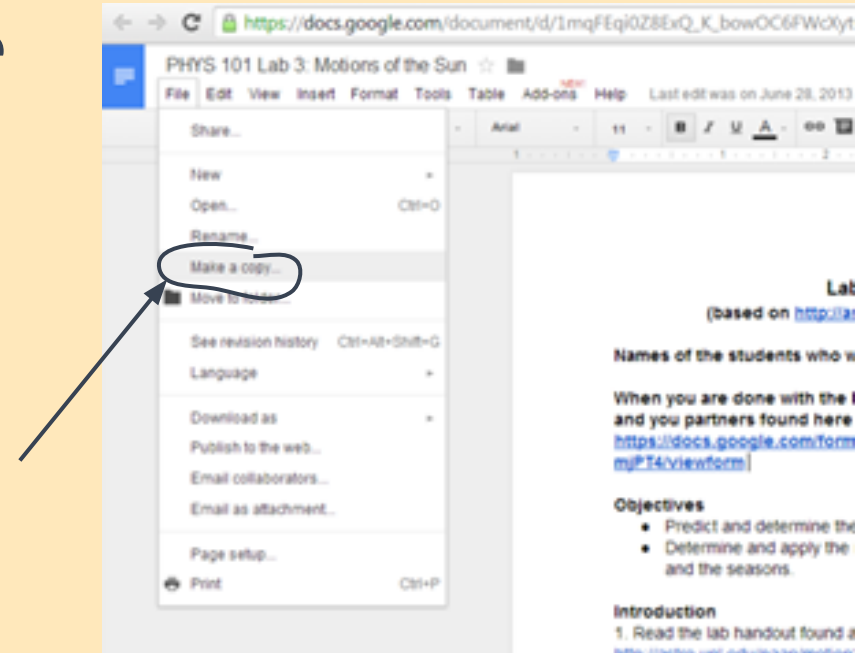
The screenshot shows the Canvas LMS interface for CWU. The top navigation bar includes "Courses & Groups", "Assignments", "Grades", and "Calendar". The user is logged in as "Bruce Palmquist" with an "Inbox" notification. The course page is titled "PHYS 101 Lab Group 1" and shows a list of pages. The "Pages" section is expanded, showing a table of links for Lab 2 through Lab 7.

| PAGE TITLE | CREATION DATE | LAST EDIT |
|------------|---------------|---------------------------------|
| Lab 2 link | Jun 29, 2014 | Jun 29, 2014 by Bruce Palmquist |
| Lab 3 link | Jul 4, 2014 | Jul 4, 2014 by Bruce Palmquist |
| Lab 4 link | Jul 4, 2014 | Jul 4, 2014 by Bruce Palmquist |
| Lab 5 link | Jul 4, 2014 | Jul 4, 2014 by Bruce Palmquist |
| Lab 6 link | Jul 4, 2014 | Jul 4, 2014 by Bruce Palmquist |
| Lab 7 link | Jul 4, 2014 | Jul 4, 2014 by Bruce Palmquist |

<http://goo.gl/aAOLAE>

Making templates

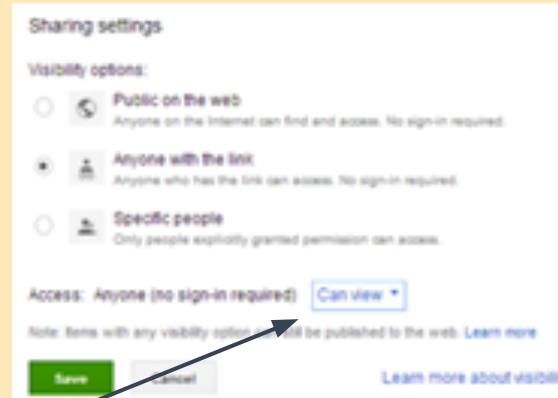
- Write the lab in Google Docs or copy/paste from Word.
- Make a copy for each group. Under “File”, select “Make a copy”



<http://goo.gl/aAOIAE>

Sharing templates

- Set sharing permission to “Anyone with the link can edit” before making the copy.
- Post each group’s link on Canvas



Typical lab activity

- Astronomy simulation from NAAP
- Motions of the Sun lab
- I go over the lab features in a Google+ Hangout (sample)
- Lab template

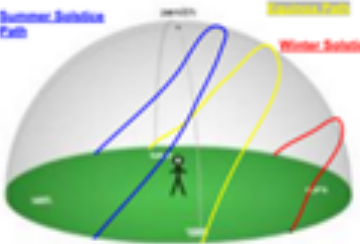
The screenshot shows the 'Motions of the Sun Simulator' interface. The main window displays a 3D model of the Earth with the Sun and its shadow on a horizon. The interface is divided into several sections:

- Time and Location Controls:** Includes a dropdown for 'the day of year' (set to 27 May), a month selection bar (Jan to Dec), a time of day selector (set to 12:00), and a latitude selector (set to 40.8° N) with a world map.
- Animation Controls:** Features a 'start animation' button, 'animation mode' (radio buttons for 'continuous' and 'step by day'), and 'animation speed' (set to 3.0 hrs/sec).
- General Settings:** Includes checkboxes for 'show the sun's declination circle', 'show the ecliptic', 'show month labels', 'show underside of celestial sphere', and 'show stickfigure and its shadow'. A note states 'dragging the sun's disk changes the ...' with radio buttons for 'time of day' and 'day of year'.
- Information:** Provides a description: 'The horizon diagram is shown for an observer at latitude 40.8° N on 27 May at 12:00 (12:00 PM)'. It lists 'advanced' parameters: sun's hour angle (0h 2m), sidereal time (4h 21m), equation of time (2:49), sun's altitude (70.6°), sun's azimuth (182.0°), sun's right ascension (4h 19m), and sun's declination (21.4°). There is also a checkbox for 'show analemma'.

<http://goo.gl/aA0lAE>

Typical lab activity

- After the lab is due, change the sharing from “Anyone with the link can edit” to “Anyone with the link can view”



Summer Solstice Path
Winter Solstice Path
Equinox Path
Zenith

Question 5: Suppose that you are in Seattle, WA and on July 10 you wake up early and note the rising azimuth of the sun. In which direction would the value change if you measured it two weeks later?
It would be traveling South.

Question 6: Note that the sun can never be at the zenith for Seattle. How far would you need to move on the Earth to find a latitude where the sun can be at the zenith?
You would need to travel to the Tropic of Cancer at 23.5°N. About 2000 miles south.

Question 7: Set up the simulator for Nordkapp, Norway which has a latitude of 71° N. Complete the following chart for the meridional altitude and the rising and setting azimuths for the 3 major paths of the sun.

| Date | Meridional Altitude | Rising Azimuth | Setting Azimuth |
|------------------|---------------------|--|-----------------|
| Summer Solstice | 42.4° | 0° "Better to say it doesn't set on this day." | 0° |
| Autumnal Equinox | 19.4° | 89.8° | 269.7° |

Peer assessment

- Each lab template has a [link](#) to a peer assessment form using Google Forms.
- Students fill out the form and submit it
- The data goes to a spreadsheet

Peer evaluation for google efforts

You will rate, on a score of 0 to 5, the quality of work, effort, and collaboration each person in your lab group put into this week's lab.
5 is a nearly ideal rating that is difficult to attain.
4 is a rating that would be expected of a busy person trying to fit this activity into their busy life. They have done their part and communicated well.
3 is a rating for someone who makes a few minor contributions and/or does not collaborate very well.
1 or 2 are ratings for people who make a token contribution.
0 means no contribution or participation.

* Required

Select your group number *

Your last name *

Your first name *

Your CWU ID number (must be correct for this form to count) *

How would you rate the quality of your own work, effort, and collaboration for this week's lab? *

0 1 2 3 4 5

Did not participate ● ● ● ● ● ● Very high quality work, maximum effort, effective collaboration

How would you rate the quality of your own work, effort, and collaboration for this week's lab? *

0 1 2 3 4 5

Did not participate ● ● ● ● ● ● Very high quality work, maximum effort, effective collaboration

Partner 1's last name *

Partner 1's first name *

How is the grade determined?

- If the average peer grade for a student is from 4 to 5, student gets all awarded points.
- If the average peer grade is less than 4, her grade for the lab is reduced based on the peer grade fraction.

| Instructor's lab grade | Ave. peer grade | Calculation | Points awarded |
|------------------------|-----------------|----------------|----------------|
| 10 | 5 | peer > 4 | 10 |
| 10 | 4 | $10 * (4/4)$ | 10 |
| 10 | 3 | $10 * (3/4)$ | 7.5 |
| 10 | 2.5 | $10 * (2.5/4)$ | 6.25 |

Does this method work well?

Advantages

- Collaboration done synchronously or asynchronously
- Instructor controls the templates
- Peer evaluation --> accountability

Disadvantages

- Making templates is time consuming
- So is compiling peer grades
- Instructor don't know the reason for a peer grade

Questions?



<http://goo.gl/aA0lAE>