

“Rising Stakes” Collaborative Writing Projects: Tools, Techniques, & Tips

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Semester-long “rising stakes” writing projects are an authentic learning experience that uses peer interactions to motivate students and improve outcomes. In the low-stakes phase, students write blocks of a larger collaborative project. Peers and the instructor provide feedback and suggestions for improvements. In the high-stakes phase, students use the collaborative resource to complete a final course assessment. Here we describe how to organize a semester-long collaborative project, our assessment methods, and general strategies for implementing collaborative writing in a variety of courses.

Keywords: technical writing, formative assessment, course projects, peer instruction

Introduction

Rising stakes writing projects are multi-part collaborations completed by an entire class of students over the course of a semester. In the low-stakes phase, teams of 2-3 students write and revise sections of a larger document to be shared by all members of the class. Other students and the instructor provide feedback to guide revisions. For the high-stakes phase, students use the document they created to complete a final graded assessment. In our case, students use their compiled product as “open notes” while they take the final written course exam. A lab practical or other cumulative graded assignment works just as well as the final high-stakes assessment.

Why rising-stakes writing works:

1. It relies on best practices that most instructors know and use already. This simplifies connecting projects with other existing class activities.
2. Other students provide formative assessment feedback along with the instructor.
3. The timeline makes students step back and wait for feedback on initial drafts before they revise their work again.

4. Online tools simplify peer review and document each author’s contributions.
5. The process stresses collaboration. Individuals know that if they do not give their best effort, the entire class will be less successful. This promotes greater engagement.
6. The final assignment is a more authentic form of assessment. Students create a **shared** technical document on which their colleagues will rely. This mirrors the technical resources and working environment students will see as professionals after college.

Example of a Completed Rising-Stakes Project

The site used to create the screenshots in this chapter was created by students in a lecture course called **The Biology of Cancer**, offered Fall 2014. A completed lab project looks very similar. Students self-register into the site during the first week of the semester. Then registration closes and the site is restricted to student authors and instructors only. In the sample project, logged in users see this page:

Figure 1. Sample topic page, showing the organization tabs.

Listed on the right side under **Quick Links** are **Topic Pages**. Each topic page is ONE of the eight rising-stakes writing assignments students completed in this

particular course. Clicking on a topic opens its page. Each **Topic Page** has content arranged in 3 tabs (Figure 2).

Figure 2. Sample topic page, showing the organization tabs.

- The content of each tab is as follows:
- **Reading Tab:**
 - Assigned reading in the textbook.
 - Questions that guide students to key points in reading.
 - Links to 1-2 primary literature papers students will read and discuss in class.
 - A homework assignment with questions about the paper.
 - **Topic Summary Tab:** contains the shared class notes.
 - **Paper Summary Tab:** synopsis of primary literature article a student team presented.

The instructor posts guide materials for each topic under the Reading tab. All text, tables, and illustrations under the Topic Summary and Paper

Summary tabs is written or compiled and posted by the students assigned to that topic.

The instructor demonstrated expectations by writing and posting the first two topics (in this example course, Tumor Viruses, and Oncogenes). Pairs of students taking the course chose 8 of the remaining 10 topics. Student pairs wrote shared class notes for their chosen topic, led a class discussion of a primary article relating to the topic, and posted article summary. The instructor

completed the final two topics not chosen by a student team (Genetic Integrity; Angiogenesis and Metastasis).

Collecting Feedback From Peers and Instructor

Students not assigned to a particular topic were required to post feedback on both the instructor's and student teams' topic pages. All comments were posted directly to the individual pages using an embedded **Comments tool** (Figure 3.)

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Figure 3. Wiki page editing and commenting tools.

Notes for the Instructor

Designing a Rising-Stakes Writing Project

Pre-semester Preparation

First identify the general topic for the full writing project. Keep in mind that the project **must** be too large for a few students to complete successfully. If the project is too simple, highly motivated students may be tempted to take over and leave less motivated students behind. Then divide the topic into 7-10 smaller **topic blocks** requiring approximately equal effort.

Next write or assemble **specific** writing guidelines. (Sample guidelines are provided in the Appendix.) These should explicitly describe:

- What is expected in each team's block;
- How teams will submit draft blocks;
- Where and how peers make comments on blocks;
- The instructors' expectations when they revise blocks; and
- How students will use the compiled project in the high-stakes final activity.

We design most project schedules around weekly deadlines. This makes it easier for everyone to remember due dates. Using weekly deadlines, the **maximum size** of a one-semester project is 10 blocks. We often have delays due to weather or holidays, so normally plan for 8 blocks. If more blocks are needed, either shorten the time between block deadlines to 5 days, or create 2+ projects that will run in parallel.

Once the topic blocks are established, write out a detailed schedule showing **all** due dates for the semester. Having a complete schedule at the outset is **ESSENTIAL**, even if it changes later. A detailed schedule reassures students that the project has been planned well and can

come together successfully, even if they do not see how at first.

Setup and Demonstration Phase

At the start of a semester students are assigned to teams, and given project writing guidelines and a schedule. (Tips on forming teams are provided in the **Tools** section.) Each team signs up to write 1 topic block of the larger project. The instructor can fill in gaps on topics not chosen by students.

Early in the semester the instructor writes the first 1-2 blocks, and posts them to a shared course web site. These blocks provide a blueprint for future submissions. We find students' drafts are much better when they see a complete example *in situ* that demonstrates instructor expectations.

Students' first assignment is to make comments and suggestions for improvement on the **instructor's** topic page. We find that seeing peers commenting on the instructor's work greatly reduces student anxiety over peer review. The instructor can help the process by leaving a section of their topic page incomplete or underdeveloped intentionally; students who are unsure of their analytical skills gain confidence when they see an obvious target for improvement. If students do not point out the errors, the instructor should point them out later.

Once students have made comments the instructor revises their original draft as suggested. **The main pedagogical goal at this stage is to build students' trust in the process.** Resist the urge to go beyond students' comments and correct everything. Leave minor errors and omissions for "discovery" later in the final revisions and polishing stage of the project.

Repeating Low-Stakes Phase

In the low-stakes part of the project, **each student team** goes through a 3-step process.

Step 1: Writing Initial Drafts

- The team writes a draft of their topic or block in the larger collaborative project.
- The team posts its draft to a shared course web site or repository.

Step 2: Peer Review, then Instructor Review

- Peers have 4-7 days to provide initial feedback and suggestions for improvement.
 - Peer reviewers have a structured template for making comments, which should be described in the writing guidelines
 - Peer reviews are scored as part of regular homework assignments.

Tips:

- Score reviews primarily for completion and for actionable suggestions.
- Do not accept peer reviews late. It inconveniences the original authors.
- The instructor reviews the page **and peer comments**, makes their own suggestions to the authoring team, and suggests which peer comments to ignore (if needed).

- The instructor makes recommendations to the peer reviewers (i.e., rest of the class) on how to improve their comments next time.

Step 3: Revise

- The student authors have 4-7 days to make changes to their topic based on peer and instructor recommendations.
- The instructor assigns an interim grade for the topic page.

Teams complete these steps on a staggered schedule; i.e., as the third team is writing their initial draft block, the second team's posted draft is being peer reviewed, and the first team is revising their block to incorporate peer and instructor comments. Repeatedly moving between topics is intentional; it helps students make connections and learn more deeply.

Table 1 is an example schedule of a project for 8 student teams. Such frequent deadlines can be confusing (even for the instructor), and keeping students on track is a challenge every semester. **Maintaining a shared online calendar specifically for the project is extremely helpful.** Be sure to list ALL due dates, with a 1-2 word description of what is due and which team is responsible.

While not a formal policy, we try to be flexible when students ask to move due dates back 2-3 days. Students' schedule change, and pushing back a deadline usually results in a better end product. Only move back the schedule **for that specific topic block**. Keep due dates of future topic blocks as they are.

Table 1. Sample 7-day rotation schedule.

Wk. in sem.	Demo Phase	Authoring Teams (Low-Stakes Phase)		
		Draft block due from:	Peer comments due for:	Final block due from:
1	Hand out guidelines			
2	Instructor posts draft block			
3	Comments due on block	Team 1		
4	Corrected block due	Team 2	Team 1	
5		Team 3	Team 2	Team 1
6		Team 4	Team 3	Team 2
7		Team 5	Team 4	Team 3
8		Team 6	Team 5	Team 4
9		Team 7	Team 6	Team 5
10		Team 8	Team 7	Team 6
11			Team 8	Team 7
12				Team 8
13, 14	High-stakes cumulative assignment			

High-Stakes Phase

At the end of the semester, each team and the instructor spend additional time revising their prior work, correcting missed errors, and adding text or links connecting blocks to each other. Then students use the collaborative project to complete a final evaluation activity. Like the original writing project, the final evaluation must be too complex for students to complete without using the class' shared final product.

For the demonstration project shown earlier, the final evaluation activity was an "open-website" cumulative course exam. Students could consult the web site they had constructed to answer questions, but could not consult their textbook or outside sources. In addition, several short answer questions on the final exam were extracted directly from the peer comments.

A final exam is not the only option for the high-stakes endpoint. Table 2 lists other possibilities.

Table 2. Possible projects and endpoints for lab courses.

Collaborative Activity	High-Stakes Endpoint Activity
Students build a diagnostic key of local aquatic or terrestrial invertebrates.	Students use the key to identify unknown organisms on a final lab practical.
Students assemble math, statistics, or computer analysis guide.	Students use the guide while they complete a complex analysis.
Students create a shared manual of lab protocols and procedures.	Students design a complex procedure, making direct reference to the shared protocols.

Tools, Techniques, & Tips

Assembling Teams

We do not let students form their own teams. The best writing teams have diverse views and skills, but students tend to choose partners with similar mindset. Regardless of the criteria used, be transparent about how teams are assembled. (See Michaelsen, et al, 2004 to learn more about team dynamics.) In the past we have assembled teams by mixing chemistry and biology majors, by pairing students with versus without strong math background, or based on similar topic interests. Currently we use student responses to a first-day icebreaker survey.

Icebreaker Survey

Many instructors already use an icebreaker on the first day. We added two self-assessment questions that streamline the process of assigning teams. We give students a 3x5 index card, and ask them to respond to 6 questions:

1. What is your name, and what do you prefer to be called?
2. What is the last biology class you had, & when?
3. What are you majoring in, or thinking of majoring in?
4. What are your hobbies or outside interests?
5. What is some thing in biology you want to learn more about?
6. When we discuss topics, most of us tend to fall in one of a few categories. Which do you think describes you best?
 - **I like to think out loud.** I work out problems by talking. I sometimes say things that are not well thought out, just so I can work through them.
 - **I like give and take.** I like to share my ideas or thoughts, then hear how people respond. (Most common self-identification)
 - **I am the stew-pot.** I listen and do not say much. I take it all in, then think about it. When I do say something, it is clear I have been thinking a lot about it.
 - **I am the contrarian or devil's advocate.** I will argue the opposite view of the group, or even argue opposite what I believe or think, to make sure all the facts and ideas are heard.
 - **I am somewhere else.** I have a hard time working through problems or issues by discussing them with a group. I prefer writing or some other way, so I have trouble staying interested.

Questions. #2-5 provide us with information about a student's relative background knowledge, mindset, and curiosity. Qu. #6 helps us pair compatible working styles.

- Groups that combine students who think out loud and those who stew or give and take usually work together well.
- Avoid making any groups of stewpots only. They do not engage in discussion with each other, and may procrastinate on writing assignments.
- Separate contrarians. Other students get impatient with them trying to outdo one another.

A humorous alternate self-assessment for Qu. #6 is below. It focuses on the **skills** each team member brings to a group. The animals keep the mood light; change them to whatever is appropriate locally (for example, switch groundhog for armadillo, dog for coyote.)

- **I am the Tracker/Coyote.** If I get interested in one idea, I like to follow it as it evolves. I keep following it even when it gets hard to track. Sometimes I overlook something obvious because I am following or thinking about an earlier idea.
- **I am the Digger/Armadillo.** I dig in and go for the details. I am good at finding information, and not satisfied until I do. Sometimes I spend so much time digging into one thing that I do not have time for others I should understand.
- **I am the Big Picture/Crow.** I have to see the big picture first. I want an overview of a situation or problem, and see how the parts and issues connect together. I can have a hard time focusing on details, but I am good at summarizing situations.
- **I am the Sampler/Bumblebee.** I grab bits of many things, then put them together into a story. To someone else it looks random or chaotic, and it might not even make sense to me at first. Still, I know I am building up resources that will be useful and pay off.
- **I am the Soloist/House Cat.** I have a hard time working with problems or issues by discussing them with a group. I can seem uninvolved or uninterested, because I prefer writing or another way of working. Give me a task, then leave me to it.

As before, arrange teams with diverse skills. Trackers and diggers do well when paired with a student who looks for the big picture. Samplers bring resources to the attention of the team, but do best when they have help arranging resources into a big picture. Soloists are challenging because they may try to get by on the effort of the other team members. Consider putting all of the soloists in a single group. This forces someone in the group to rise to the challenge. That said, be ready to split the group again if no one rises to the task.

Choosing a Collaborative Writing Platform

There is no one best platform. The choice depends on what your institutional resources are, what additional tools you would like to make available to students, the time you and students have to learn how to use the platform, and cost. Suggestions to get started are below. Please contact the author if you would like to discuss other ideas or options.

Wiki-Based Platforms

If you have read a Wikipedia page, you have seen what a wiki can do. We prefer wiki-based platforms because they strike a good balance between being easy to learn and good backend support. Two wiki features are particularly useful.

- **Page History.** Multiple prior versions of pages are stored online. Editing errors can be corrected simply by rolling a page back to the last version (Figure 4).
- **Change Tracking.** Most wikis can track page changes and file uploads automatically. This makes it easy to monitor which students are working on pages, when, and how much each student is contributing.

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Figure 4. Screenshot of the standard text editing tools for a Tiki-based wiki page. Authorized users can *Edit* pages by default, but site administrators can modify this by clicking on *Permissions* (shown above), or by changing permissions globally (not shown). *History* opens a dialogue to view previous pages or roll back any page to a previous version. *Attach File* adds a downloadable file to the page.

We can recommend three wiki platforms based on our experiences with them:

- **Wikispaces**
<https://www.wikispaces.com/content/classroom>
 is an externally managed wiki farm that offers free sites to educators. They have excellent

support. Many faculty use them to supplement (or even replace) their institutional C/LMS.

- **MediaWiki** is the platform on which Wikipedia runs. Many people like it because it looks and feels so familiar. Of the three, it has the steepest learning curve for students.
- **Tiki Wiki CMS Groupware** (Tiki for short) is the platform we prefer, because it also meets

several other laboratory and research program needs.

Externally managed sites (Wikispaces) are the easiest to use (and often free) but have some functional limits. Managing a personal site for collaborative writing requires more time, but is more flexible. If your institution does not offer web hosting internally, renting commercial server space costs \$5-10 a month. Bluehost (<http://www.bluehost.com>) is a top-rated national provider with data centers across North America. An account on a shared server costs ~\$7.00 a month (billed annually). Bluehost offers automated scripts for installing both MediaWiki and Tiki Wik CMS Groupware. An award-winning help system guides novice users through launch and management.

Non-Wiki Options

Google Docs / Google Sites (www.google.com) are good choices for mostly text-based writing projects, but not a good choice (at present) for media-rich collaboration. Google's web site tools have a fairly steep learning curve, and sites built with Google tools are hard to modify if the standard template does not fit how you want your final project to look and operate.

WordPress (www.wordpress.org) is a good choice if the course goals include improving students' digital literacy skills. WordPress does not handle a large number of authors well. Also, do not get bogged down in endless theme changes and tweaks. Pick a basic text-oriented blogging theme, create a few skeleton page templates, and launch the site. Wait to add new tools until there is demonstrated need, or students ask for them. Administering a WordPress site can be tricky; make friends with a local contact who knows the platform at your home institution, or plan to spend several weeks learning it.

Open Science Framework (<https://osf.io/>) is a recent addition. The Center for Open Science launched OSF to support collaborative research projects. Any registered user (accounts are free) can be added as a collaborator on a project, then given permission to create, edit, and access project resources. OSF looks to be a good choice for data-rich collaborative writing.

Campus content/learning management systems (C/LMS) like Blackboard, Sakai, etc., include collaborative writing tools. Their chief advantage is being linked to institutional sign-on already. However, most have collaborative writing tools that behave erratically. Several do not track which student contributed specific parts of documents, making evaluating students harder.

Questions During and After the Workshop

Can this Be Scaled up to Larger Courses?

Yes, if you commit to proper advance planning. Once again, clearly communicate the schedule and expectations, especially if multiple instructors are involved.

For example we implemented a rising stakes project in a general ecology lab course with ~100 first- and second-year students, enrolled in six lab sections of ~18 students each, which were led by three graduate teaching assistants. The general assignment for all sections was to build a network map of interconnections within a single ecosystem over the semester; each lab section focused on a different ecosystem, which we selected in advance. Every week students wrote ½- or 1-page summaries (with text and images) of a component within their section's ecosystem. Through weekly topics students identified primary producer(s), key abiotic factors, primary consumers, apex predators, decomposer/recyclers, etc. Data from all students' weekly low-stakes submissions was posted to shared space. For the final assessment, each student drew their own network map and wrote a summary for the entire ecosystem. We discussed progress on the project as part of weekly lab prep meetings, and one faculty member checked the online documents regularly to ensure each lab section progressed as planned.

Do "Open Notes" Exams or Other Open and Collaborative Activity Inflate Grades or Favor Some Students?

Not in our experience. If the final exam no longer has to evaluate basic factual recall, the revised exam can focus instead on cross-cutting principles, and higher thinking skills instead. This usually cancels out points gained by having the basic facts at hand. We also find that lower performing students invest less time in understanding the information, and so cannot interpret or apply it as efficiently as students who are motivated and engaged. In short, students who put forth the effort score higher than students who do not put in as much effort.

Others have reported similar results. Students given the opportunity to use their own notes during an exam do not score significantly higher than students who relied on memory alone (Sato, et al., 2015), or score higher initially but not on subsequent re-test (Agarwal, et al., 2008, 2011.)

Supporting Documents

The supporting documents are listed in appendices in the order students receive them. Samples are available along with the original slide presentation.

Appendix A: Sample Writing Guidelines

These should describe what is expected for each team's block; how and where to submit initial writing blocks; how and where peers make comments; instructors' expectations when revising content; and how students will use the resource in a high-stakes final activity.

Appendix B: Sample Team Assignments and Topics

Once the instructor has decided the working teams, students receive a list of the team members, and the topics from which they can choose. Be sure to include the approximate dates when topics will be covered, so students can plan accordingly.

Appendix C: Sample Assessments and Rubrics

The specific rubrics used on the demo site to evaluate draft and final topic pages, and criteria for evaluating peer comments. It also has a description of the format for the high-stakes final exam, with sample questions and general grading rubric.

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About the Author

A. Daniel (Dan) Johnson is a Teaching Professor and the Core Curriculum Coordinator in Biology at Wake Forest University in Winston-Salem, NC. He has spent 17 years developing inquiry lab activities and lab support resources across the range of biology. He also is the founder and director of The Adapa Project, an open consortium of educators, educational researchers, students, and developers bringing best practices to the classroom that help more students learn science successfully.

Appendix A Sample Writing Guidelines

Collaborative Writing Project for Biology of Cancer – Fall 2014

This is a seminar course where we will teach each other. We will explore several topics that are central to cancer biology. Although we'll discuss the topics separately, they are deeply interconnected. To help you understand the topics and see how they are connected, you will be working in teams to create course notes and resources for our private course wiki site.

Topic Teams

Based on your responses on the opening day survey and my observations during the first week of class, I will assign you to teams of 2-3. Starting mid-September each team will co-teach one course topic with me. The team will become our local experts on their topic, and responsible for helping the rest of us understand it. You get to choose the topic your team will work on.

Your Tasks

Each team will:

- Write a set of class notes for their topic.
- Present a primary literature article.
- Write a summary of the article you presented with notes on our class discussion.
- Post all these materials to our course wiki site.

I will meet with each team to discuss which specific concepts are most important within the larger topic, help you choose a research paper to present, suggest background reading that can help you interpret the paper, and help with any technical problems.

I will suggest primary research papers based on where our discussion has led us, but will consider other papers that you find. It may be a paper that extends our understanding of the central concepts, challenges an idea, or explores clinical implications. Most papers we read will have been published within the last 5 years.

General Workflow

Before we start a new topic: the textbook reading and primary literature articles will be posted 5-7 days before being presented in class, along with questions to help guide reading and serve as a starting point for discussion.

Day 1 of a New Topic: I will overview the key principles everyone should know.

Day 2 and 3 of a Topic: your team will present a primary research article.

- If you are not on the topic team presenting the paper you must submit responses to these questions by 9am on the day we are discussing the paper.
- If you are presenting, you have enough to do already. You do not need to turn in responses to the questions.

Within 7 days after your team finishes presenting on your paper: you will write and post a topic summary page on our course wiki site. The page must have:

1. Class notes with supporting data tables, photographs, and graphs.
2. A summary of the article you presented.
3. Notes on our class discussion.

After your topic summary page is posted: the other students in the class have 7 days to post **their** feedback and comments. Their posted comments also count as part of their homework assignments for the course. At a minimum I expect every student in the class to:

1. Point out 1 element (or more) of your page that is particularly well done.
2. Identify at least 1 area or item that needs clarification or improvement.
3. Pose 1-2 follow-up questions that your class presentation or summary raises for them.

I also will read your summary and make my own comments and suggestions.

Once I send you comments: you will have 7 days to make revisions. Then I will temporarily lock your topic page and grade it. After grading, I will re-open it for editing.

The Final Exam

At the end of the semester everyone will have 1-2 days to make any final changes. Then I will lock all pages so everyone can use the site to write their final exam.

The exam is closed book, but open wiki site. **For the exam you can use anything that the class has posted or developed for our collaborative wiki space.** The format and questions will be tailored to our course discussion, so I cannot give you specific examples yet. We will talk more about the format as the semester progresses.

Technical Details

Where do we register for the private course wiki site?

- I will send you an email with a registration code. When you receive it, go to this address: <http://www.adapaproject.org/bio373>.
- In the upper right corner, click **Register**, enter the registration code, and follow the instructions.
- To make tracking easier, please register using your email name (the part before the @ symbol) for your username. Choose any password you wish.
- Once you log in successfully, you will see a home page like Figure A1.

Please sign up immediately. Registration closes on Friday, Sept. 16th.

Figure 1. The main home page. On the right side under **Quick Links** are the **Weekly Schedule** and **Topic Pages**. Click on a topic to open that page.

How And Where Does Our Team Post the Class Notes and Article Summary?

A blank topic page has been created for you with assigned textbook reading, but nothing else.

- Under **Topic Pages** list, click on the page you want to change.
- Scroll to the bottom of the page, and click **Edit This Page** (Figure A2).
- The wiki editor window will appear. It has point-and-click formatting just like MS Word.
 - You also can use the wiki markup code. Markup code is easy to learn in about 20 minutes, and lets you write faster.
 - For an introduction to wiki markup code, [go to the markup tutorial](#). To go deeper, read the [Users' Guide](#).
- If you forget how to mark up a particular special character or format, click on Help (a circled “?” symbol) in the editor window to get a quick reminder.
- When finished, click **Save**. Your new page will be visible to the class.
- To make revisions, click **Edit This Page** again.

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Figure 2. Editing and page management tools.

Warning! Do not copy/paste text directly from MS Word into pages. The text contains hidden markup that creates big problems later. To use text from an MS Word document, first paste it into a plain text editor like NotePad++ (Windows) or TextEditor (Mac). Then copy it again from NotePad/TextEditor, and paste it into the wiki page. This strips out the hidden codes.

Where Do We Get Photos, Illustrations and Tables to Include in the Notes or Paper Summary?

- I have a DVD with all of the images and tables from our textbook.
- You can get more illustrations and images from these sources.
 - National Cancer Institute (www.cancer.gov). Unless labeled otherwise, images created for NIH and other federal government web sites can be reused by others if they cite the source. Put the URL of the original web page from which you obtained the image in the figure legend.
 - Wikimedia Commons (<http://commons.wikimedia.org>). Click on an image to open a licensing and source box to see the instructions for citing it properly.
 - Creative Commons Search (<http://search.creativecommons.org/>). This search tool finds images tagged with a Creative Commons license.
- Be sure that you properly cite the source of EVERY image or table you use.

How Do I Enter Comments on a Topic Page?

- Log in and click the title of the topic page you need to comment on.
- Scroll to the bottom (Figure A3), and click **Comment**.
- Type your comments and click **Save**.
- To make changes in a previous post, click Comment again.

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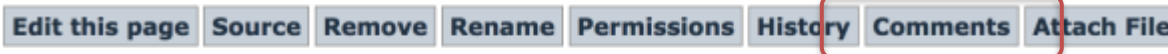


Figure 3. Opening the comments dialog.

Some of the Comments Our Team Got Don't Make Sense or Conflict. What Do We Do Now?

This is normal. The more people reviewing your work, the more likely two will disagree.

- Email the students who wrote unclear comments and ask them to clarify. Each comment is tagged with their sign-in name. Or, ask a third person what they think.
- Look at contradictory comments carefully.
 - Are two people interpreting an unclear figure or sentence two different ways? If so, focus on correcting and clarifying the confusing information.
 - Is one comment a matter of style, but the other a substantial issue? If so, respond to the substantial comment, and let the style go.
- Ask the instructor to help you decide how to respond.

How Will You Grade Our Topic Pages? What Are You Looking for When We Revise Our Page?

How Will You Grade Our Comments on Pages? What Are You Looking for?

- The rubrics for grading your work are attached (see Appendix C.)

Appendix B

Sample Team Assignments and Topics

Biology of Cancer – Fall 2014: Teams and Topics

Based on your responses to the questions I asked you the first day of class, I have divided you into 6 teams as follows:

- Team 1: Georgina W., Erin B.
- Team 2: John A., Sally H., Jamie Q.
- Team 3: Ta'mie J., Patrick H.
- Team 4: Jim M., Sandra A., Paul R.
- Team 5: Jonna P.-J., Alex H.
- Team 6: Ben F., Virginia Y.

Contact the others in your team, pick your first and second topic choices, and send them to me. Be sure not to overload your schedule. Remember, for the topic you choose you will:

- Write a set of shared course notes and post them
- Lead a paper discussion
- Summarize the paper and post it
- Revise your course topic page based on instructor and peer comments.

Once the list of teams and topics is final, I will send an updated schedule of assignment due dates. That schedule also will be on our shared Google calendar.

Topics

Dates	Teaser	Team
Sept. 9, 11: Oncogenes (Chs. 4, 5).	How does cancer take over normal signaling pathways?	I will lead, & post sample page
Sept. 16, 18, 23: Tumor Suppressors (Ch. 7).	Why does 1 mutated tumor suppressor lead to 2, then many?	
Sept. 25, 30, Oct. 2: Cell Cycle Control by Rb (Ch. 8).	Mitosis is a tightly controlled process. Why does it break down so completely?	
Oct. 7, 9, 14: Regulation of Apoptosis by p53 (Ch. 9).	Damaged cells should die rather than kill their host organism. How is that turned off?	
Oct. 16, 21, 23: Cell Immortalization (Ch. 10).	Cells cannot divide forever. They get old and die. Cancer cells don't. Why?	
Oct. 28, 30, Nov. 4: Genetic Integrity (Ch. 11)	How is a cell's DNA damaged? Does that always lead to cancer?	
Nov. 6, 11, 13: Tumorigenesis (Ch. 12).	How many steps does it take to make cancer cells? Are there really cancer stem cells?	
Nov. 18, 25, 27: Cell inter-actions, signaling (Ch. 13).	Forget about rogue cells; let's talk rogue organs.	
Dec. 2, 4, 6: Angiogenesis, metastasis (Ch. 14).	Metastasis is NOT random; it is a choreographed dance. What are the steps?	

Appendix C

Sample Assessments & Rubrics

Low Stakes Assessments

The primary goal in the low-stakes assessment is giving students regular, actionable feedback.

Sample Rubric for Topic Pages

This rubric can be completed in less than 2 minutes, and tells a team exactly what to focus on during revision. It stresses 3 main elements: content, organization, and interconnections. For each element there is one score for physical/mechanical aspects (completeness, logic structure, links to other materials), and a second for pedagogical value (accuracy, clarity, topics in context.)

Content and organization should be priorities for drafts and initial revisions. Interconnections are more important towards the end of the project. Teams cannot earn a maximum score unless they revisit and revise their pages multiple times as new topics are added.

	Flawed, missing 0	Serious deficits 2	Needs some corrections 3	Meets expectations 4	Exceeds expectations 5
Content (scored on both draft and final pages)					
Completeness	Multiple important concepts missing	Missing 1-2 key or 2-3 minor concepts	1 key or 2-3 minor concepts under-developed	All key concepts included	Key concepts supported with supplemental information
Accuracy	Explanations contain gross factual errors	Explanations are misleading	Some minor errors or over-generalizations	All key concepts explained accurately	Explanations of key concepts include possible points of confusion
Organization (scored on both draft and final pages)					
Logic structure	Content is unstructured, random	Structure is inappropriate for content	Not always clear why concepts belong together	Reasons for arranging content in a certain way are obvious	Team explores two or more possible structures, has clear rationale for their final choice
Clarity of presentation	Page fails to tell a coherent story	Start, end points are unclear; story is hard to follow	Coherent story overall, but 1-2 points are confusing	Text, images, figures form a coherent story that is easy to follow	Text, images, figures form tightly interwoven story that goes beyond explanation, and fosters deeper learning
Interconnections (scored on final pages only)					
Links to other materials, references	No internal references or links	Randomly scattered links	Well-connected mostly, but some obvious links are missing	Fully connected to other project topic and reference pages	Links connect to both project pages, external references & resources
Topics in context	No effort made to put topic in context	Less than half of topic has any relevant context	Relevant context for concepts, but some are not fully developed	Text, links create a clear context for all key concepts of current topic	Text, links go beyond establishing context, to suggest new ideas or creative alternatives

Other Comments:

Overall scores: Revised Draft: ____ / 20

Final: ____ / 30

Rubric for Scoring Peer Comments

Again this rubric can be completed in less than 2 minute. It tells peers how to improve the quality of comments they provide. It is organized around a simple 3-question model: what is already good, what needs to be added or refined, and what follow-up thinking does it promote? Each of the 3 items is scored separately.

	Missing 0	Serious deficits 2	Needs work 3	Meets expectations 4	Exceeds expectations 5
Points out 1+ elements of the page that are particularly well done.	No page element named	Misidentifies an obviously weak element	Names a page element but gives no explanation	Names page element, gives clear reason why it is well done.	Identifies other pages where this element might be useful.
Identifies 1+ areas/items needing clarification or improvement	No page element named	Misidentifies an obviously strong page element	Explanation is missing or will weaken topic further	Gives a clear explanation with suggested changes	Includes a specific internal or external example/model of suggested changes
Poses 1+ follow-up questions on topic summary or paper *	SOLO Level 1	SOLO Level 2	SOLO Level 3	SOLO Level 4	SOLO Level 5

*Follow-up questions are rated using the SOLO taxonomy (Biggs, 2007.) These descriptions of the taxonomy scale points were originally published by the Center for Learning Enhancement and Research at The Chinese University of Hong Kong (www.cuhk.edu.hk/clear/).

- *SOLO Level 1: Pre-Structural Level*
Question(s) suggests the student has missed the point, lacks basic understanding of topic. Question is based on incorrect or irrelevant information. The question is unorganized, unstructured, and essentially void of actual content or relation to a topic or problem.
- *SOLO Level 2: Uni-Structural Level*
Question(s) suggests the student can deal with one single aspect of topic and make obvious connections. The question indicates student can use terminology correctly, recount facts, and paraphrase concepts.
- *SOLO 3: Multi-Structural Level*
Question(s) suggests the student is considering several concepts or aspects of topic, but the concepts are stated or used independently without making connections.
- *SOLO 4: Relational Level*
Question(s) suggests the student has made connections and interrelations between several concepts or aspects of the topic.
- *SOLO 5: Extended Abstract Level*
Question(s) suggests the student is making generalizations, considering different perspectives, and applying concepts or ideas presented to new areas.

Sample High Stakes Assessment

Exam Format & Sample Questions

In the course where the example writing project was implemented (Cancer Biology), students received a take-home final exam on the last day of regular class. Final responses were due 7 days later during the regular exam period. Students could use the shared wiki they had created and ask the instructor for clarification, but could not talk with classmates or use the course textbook.

Part 1 consists of 6 questions that cut across topic boundaries. Students chose 5, and their responses counted for 50% of overall exam grade. These are sample questions:

1. On the first day of class, we compiled a list of what you already knew about cancer. Here is that original list of traits and characteristics. (*Author's note: to protect confidentiality, the pre-class list was deleted prior to publication.*)

Given your understanding of cancer now, please explain how the general model summarized above has to change or be altered. What is missing that should be included, is in the list now that should be revised, or listed that should be removed?

2. What is the importance or role of evolutionary selection in cancer? Give at least 3 separate examples to support your explanation.
3. There is an alternative theory of cancer we did not discuss: the “inflammatory theory.” Briefly, mutation and cellular changes alone cannot create a clinically important tumor. Cancer requires low-level, body-wide chronic inflammation to activate leukocytes. How would you respond to this idea?

Part 2 consisted of questions students posed in their topic page comments, that were answered in a subsequent topic or discussion. Students choose 5 questions (no more than 1 per topic), and wrote a short response. Summed scores counted for the remaining 50% of overall exam grade. Sample questions from 2 topic pages are below.

Topic 2: Oncogenes

- A. There is correlation between people who have a low copy number for *myc* and longer survival rates. Could drugs inactivate multiple copies of risky genes like *myc*?
- B. Chromosomal translocations the Philadelphia Chromosome [t(9;22)] occur in many cells, but it seems they affect mainly lymphocytes. Are there any other cells that translocation affects that could also lead to cancer besides lymphocytes?

Topic 6: Cell Immortalization

- A. How can mutation reactivate TERT and immortalize cells? Do we know why certain specific mutations are able to reactivate TERT, and then once it is reactivated, what other things have to happen concurrently to actually make the cell immortal?
- B. Do all cells pull out of crisis mode? What is the effect of cells that do not pull out of crisis mode?

Scoring Exam Questions

Ideally, the high stakes assessment is scored using similar criteria as the low stakes elements. For example, the rubric used to score final exam questions (below) is based on the rubrics used for the topic pages and peer comments. The point scale is set so that students who meet all expectations earn a final score of 20/25 to 21/25 per question (80% to 84%). To obtain a higher or lower overall average, adjust the point scale.

	1 pt.	2 pts.	3 pts.	4 pts.	5 pts.
Factual Content					
Completeness		Missing 1-2 key or 2-3 minor concepts	1 key or 2-3 minor concepts under-developed	All essential concepts included	Key concepts supported with ancillary information not used in class
Accuracy		Explanations contain gross factual errors	Some minor errors or over-generalizations	All concepts incorporated accurately	Response points out where current evidence is weak or conflicting
Logic and Organization					
Logic structure	Answer is unstructured, illogical	Structure is inappropriate for question asked	Essential facts, concepts present, but it is unclear why they belong together	Answer flows logically from point to point	Answer has unique logical structure not used in topic pages or course materials.
Clarity	Random facts with no path or direction	Response rambles and is hard to follow overall	Coherent story overall, but 1-2 points are confusing	Response tells a coherent story that is easy to follow	Response tells 2+ coherent stories that are well connected to each other
Connections In & Across Topics					
SOLO Rating	Level 1	Level 2	Level 3	Level 4	Level 5

- *SOLO Level 1: Pre-Structural Level*
Answer suggests the student lacks sufficient understanding of topic to begin answering the question. Response is almost entirely based on incorrect or irrelevant information. The response is unorganized, unstructured, and essentially void of any connection to the original question.
- *SOLO Level 2: Uni-Structural Level*
Answer suggests the student understands one specific aspect of topic. The answer is based entirely on one obvious connection or concept. The student can use terminology correctly, and recount facts and paraphrase concepts accurately.
- *SOLO 3: Multi-Structural Level*
Answer shows the student understands several concepts or aspects related to the question, but does not make clear connections between them. Each concept is discussed or described independently without reference to related concepts.

- *SOLO 4: Relational Level*
Answer shows the student understands connections and interrelations between several concepts or aspects of the topic. They can use the connections and relations to solve basic problems where all variables are known.

- *SOLO 5: Extended Abstract Level*

Answer shows the student understands connections and interrelations between several concepts or aspects of the topic, and the implications of those relationships. They can make generalizations, summarize concepts or topics from different perspectives, and apply concepts or ideas to problems where only some variables are defined. They can use information in creative, novel ways not demonstrated previously

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