

# REPLACING LECTURE WITH ONLINE VIDEO TUTORIALS



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## 5. DATA AND IMPACTS

- Students come to class **better prepared**
- **Higher energy** and **more insightful discussions** in the classroom (*classroom is LOUDER, and desks are more askew*).
- **More student engagement**
- **More critical thinking in class** (*less writing down, word-for-word, lecture notes*).
- **Improved catch-up and review opportunities** for students outside of class.
- **Greater student satisfaction** on weekly evaluations (*online and in class*).
- More **relaxed and enthused instructor** in the classroom. *Everything we do there is bonus!*
- More harried instructor out of the classroom because of all the time spent making videos.

### Quantitative impacts:

- **Increased classroom interaction** among instructor and students. Pre-flip: **~20% class time** | Post-flip: **~90% class time**.
- **Increased average exam scores** (*based on standardized student learning outcomes exam*): Pre-flip: **56%** | Post-flip: **69%**
- **Fewer discipline problems**. (*Students who don't want to put in the time drop quickly.*) Pre-flip: **2-4 incidents/class** | Post-flip: **0**
- **Increased class attendance**.  
Pre-flip: later semester drops off to **~40-60%**  
Post-flip: stays solid all semester at **~90-95%**

## 1. CITY COLLEGE OF SAN FRANCISCO

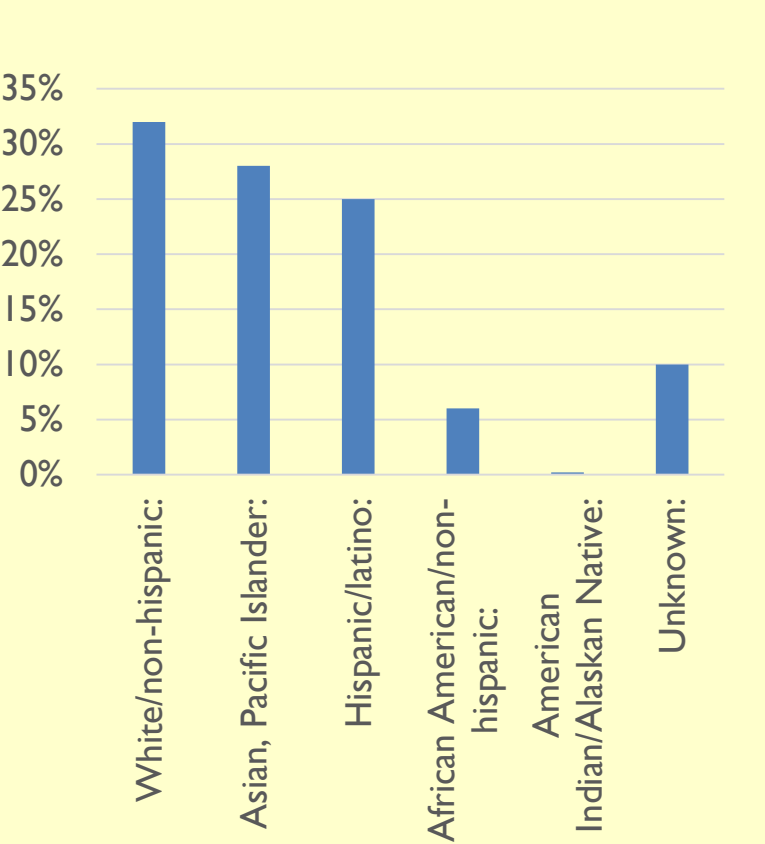
**City College of San Francisco is a two-year college.**

Most of our students are general-education students looking to fulfill a natural science requirement for transfer to a 4-year college.

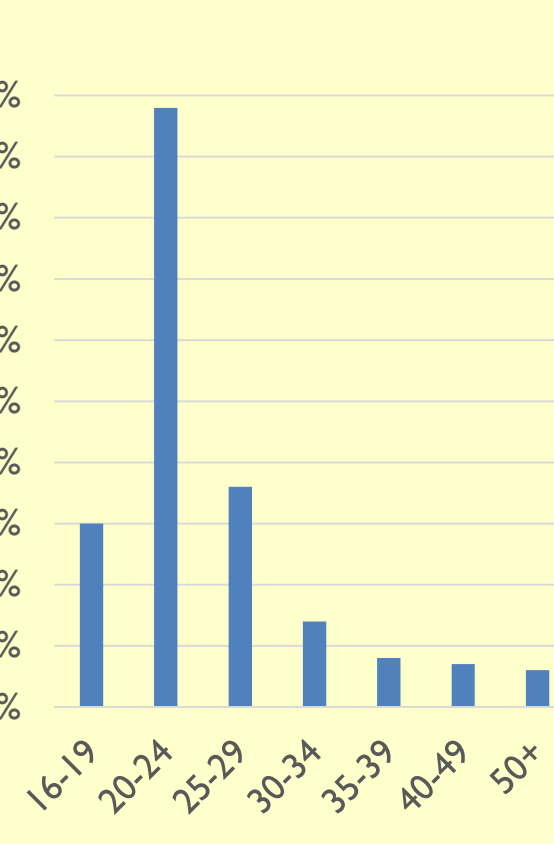
Earth Science Student Average Success Rate (*passing class with C or higher*): **57%**

Earth Science Student Gender **male = female**

Earth Science Student **Ethnic Background**



Earth Science Student **Age**



## 2. OCEANOGRAPHY

Introductory-level general-education science class covering physical, chemical, geological, and biological oceanography.

### Class details:

- 3-unit lecture (*optional lab*)
- Two 75-minute class meetings/week

**Class size:** 25 to 50 students

### Student access:

- Use the **class website** to access and watch weekly video tutorials, access links to and complete weekly quizzes, and review supplemental web resources.
- Use the **Oceanography I Workbook** to review images, data, text, and tables from weekly video tutorials, and access weekly worksheets (based on videos), concept sketches, and other activity sheets completed in class.
- Use **class time** to turn in and review completed weekly worksheets and concept sketches, engage in class discussion, and engage in class group activities.

**WIESE OCEANOGRAPHY 1 LECTURE**  
*Review Course Welcome Information for Online Section*  
*Review Course Welcome Information for Face-to-Face Section*

INSTRUCTOR: Katryn Wiese  
Questions? Contact [katryn.wiese@mail.ccsf.edu](mailto:katryn.wiese@mail.ccsf.edu)  
For my office hours, teaching schedule, and more, visit [My Faculty Web Page](http://MyFacultyWebPage)

[Study Session Schedule](#) | [NOAA's Ocean Facts](#) | [Earth Science in the News](#) | [DISSEMINATE](#) (for online section only)

[Textbook Information](#) | [Semester Project Information](#)

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**Class Introduction (return to TOP)**

To be completed by the end of the first week:

- Register for class and make sure you have
- Review special instructions for *Online*
- Purchase *supplemental class workbook*
- RECOMMENDED: Purchase or ensure
- ONLINE STUDENTS ONLY: Take the
- COMPLETE *Introduction: Survey* (Note: to take this survey, you must be passworded; go to [Web 1](#), find the bottom
- WATCH VIDEO TUTORIALS and take
- Class Policies Spring 2015 - 15
- Class Policies Fall 2014 - Face
- Discuss class policies, student learning
- Introduce yourselves to fellow students
- Read What is Science? and complete it
- Get started on video tutorials due at the

Screenshot of class website

Department of Earth Sciences  
City College of San Francisco  
**Oceanography 1 Workbook**  
Instructor: *Katryn Wiese*

Classroom during worksheet review.

First page of 250-page class workbook

## 3. REPLACING LECTURE WITH VIDEO

**When?** Since Fall 2012. I am now in my 5<sup>th</sup> semester of using this new format.

**Why?** Sheer frustration that my students were not coming to class prepared (*not reading the textbook*).

**How?** All videos I use to replace my lecture are videos I produced. I created videos originally based on my PowerPoint™ slides and then expanded as I picked up additional technological expertise.

- **Tools:** Camera, Tripod, Camtasia Studio™, PowerPoint™, Adobe Photoshop™, Adobe Illustrator™, and Audacity™.

### Process:

1. Write a script (*imagining myself in the front of a classroom with access to all materials I'd want; this script later becomes my closed-captioning and a resource for students*).
2. Use Audacity™ to record script narration (*adding in sound effects where appropriate*).
3. Gather all media I envisioned when creating script (*scientific illustrations, maps, screenshots, video of class demonstrations, video of live Earth processes: either public domain, Creative Commons, or self-produced*).
4. Use Camtasia Studio™ to combine all elements, and add in embedded quizzes, animations, and closed captioning.
5. Produce as a .mp4 and a flash-wrapped .html both published to my class website so students can access.
6. Edit continually to improve quality and eLearning: segment into shorter modules (*5-10 minutes where appropriate*), replace copyrighted material (*so available to be shared publicly*), and reduce cognitive load.



Videos are developed to incorporate typical lecture components: graphics, images, text call outs, field footage, music, interactive quizzes, demonstrations, animations, and more. Above image by Katryn Wiese and Matt Lao ([www.mattlao.com](http://www.mattlao.com)).

### Primary resources I used for designing video:

- **Podcast Solutions: The Complete Guide to Audio and Video Podcasting**, Michael W. Geoghegan and Dan Klass.
- **e-Learning and the Science of Instruction: Proven Guidelines for Consumers and Designers of Multimedia Learning**, Ruth Colvin Clark and Richard E. Mayer. 3rd edition. (2011)
- Collaborations with colleagues: <http://serc.carleton.edu/NAGTWorkshops/video/design.html>

### Primary resources I use to get good images and video:

- USGS, NOAA, NASA, NPS – government website (Public Domain)
- Flickr Creative Commons (images)
- Wikimedia (Creative Commons)
- Self produced (Adobe Illustrator™)

## 4. HOW DOES IT WORK?

1. **Video tutorials** are assigned as required pre-class homework.
2. Videos are accompanied by a **multi-page worksheet**, and an **online quiz**, both of which must be **completed prior to the first class meeting each week**. (*These ensure tutorials are watched, considered critically, and applied to problem solving prior to class.*)
3. In class, in groups of 3 or 4, students **discuss completed worksheet answers and compare with answer key**.
4. For the second class meeting, students bring and **discuss completed concept sketches** in small and large groups.
5. The rest of class time consists of hands-on demos, activities, and group discussion.

**Buffering - Activity KEY**

**BUFFERING** is the action of maintaining pH at a set level. It is a means present at work in the oceans due to the high concentration of carbon dioxide gas. The chemical equation for carbonic acid formation is:  $\text{CO}_2 + \text{H}_2\text{O} \rightleftharpoons \text{H}_2\text{CO}_3$

**DECOMPOSITION** is the action of breaking down a substance into its constituent parts. In the context of the ocean, it refers to the breakdown of organic matter into simpler compounds.

**ACIDIFICATION** is the process of becoming more acidic. In the ocean, it refers to the decrease in pH due to the absorption of atmospheric CO2.

**BASES** are substances that can neutralize acids. In the ocean, they are used to counteract the effects of acidification.

**AMPHIPHILIC** molecules have both hydrophilic and hydrophobic parts. They are important in the formation of cell membranes.

**HYDROPHOBIC** molecules repel water. They are found in the tails of phospholipids.

**HYDROPHILIC** molecules attract water. They are found in the heads of phospholipids.

**PHOSPHOLIPIDS** are the main components of cell membranes. They have a hydrophilic head and a hydrophobic tail.

**CELL MEMBRANES** are barriers that control the movement of substances in and out of cells.

**OSMOSIS** is the movement of water across a semi-permeable membrane from an area of low solute concentration to an area of high solute concentration.

**DIFFUSION** is the movement of particles from an area of high concentration to an area of low concentration.

**ACTIVE TRANSPORT** is the movement of substances across a membrane against their concentration gradient, requiring energy.

**PASSIVE TRANSPORT** is the movement of substances across a membrane down their concentration gradient, without requiring energy.

**ENDOSYTOSIS** is the process by which a cell takes in material from its environment.

**EXOCYTOSIS** is the process by which a cell releases material into its environment.

**MITOSIS** is the process of cell division, resulting in two daughter cells.

**MEIOSIS** is the process of cell division, resulting in four daughter cells.

**CELLULOSE** is a polysaccharide made of glucose units. It is the main component of plant cell walls.

**CHLOROPHYLL** is a green pigment found in plants. It is essential for photosynthesis.

**PHOTOSYNTHESIS** is the process by which plants use light energy to produce glucose and oxygen.

**RESPIRATION** is the process by which organisms use glucose and oxygen to produce energy.

**ECOSYSTEMS** are communities of living organisms interacting with their physical environment.

**BIOLOGICAL** processes are those that involve living organisms.

**PHYSICAL** processes are those that involve the physical world.

**CHEMICAL** processes are those that involve the chemical world.

**GEOPHYSICAL** processes are those that involve the Earth's physical and chemical systems.

**CLIMATE** is the long-term average weather conditions in a particular area.

**WEATHER** is the state of the atmosphere at a particular time and place.

**PRECIPITATION** is the process of water falling from the sky as rain, snow, or hail.

**EVAPORATION** is the process of water turning from a liquid into a gas.

**CONDENSATION** is the process of water turning from a gas into a liquid.

**SUBlimation** is the process of a solid turning directly into a gas.

**DEsublimation** is the process of a gas turning directly into a solid.

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