The Carbon TIMEs

A newsletter for members of the Carbon TIME environmental literacy project.

March 2013

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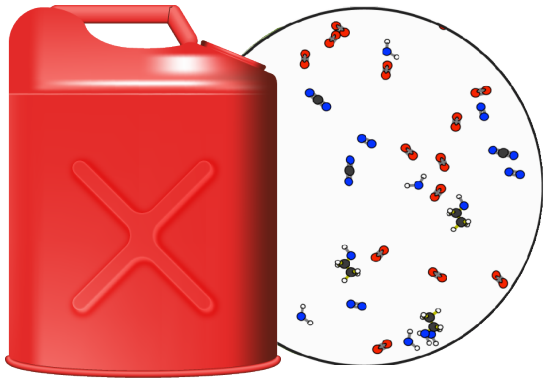


Andy's Message

Hi Folks—

This is an interesting time. We have news about all three cohorts of participants in field testing and data collection:

Cohort 1 (2011-12 school year): Our coding of overall test data is complete. We have some preliminary results, with more sophisticated analyses in progress. Read more on pages 2 and 3!

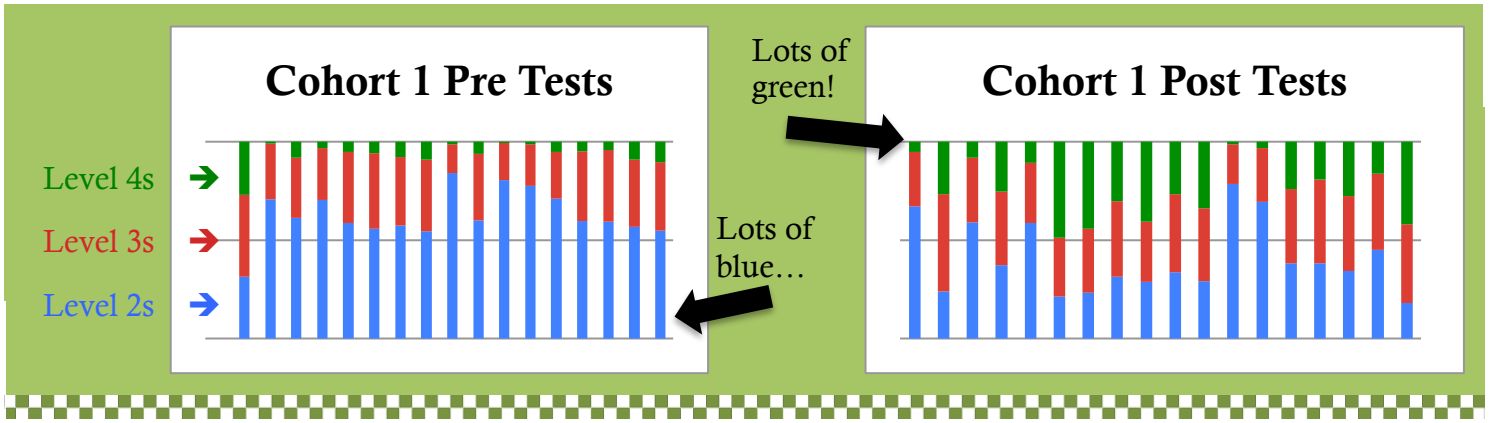
Cohort 2 (2012-13 school year): Jenny Dauer has completed the last of our winter workshops in Seattle, and we are looking forward to hearing how your teaching goes this spring. We are enthusiastic about *Ecosystems* and *Human Energy Systems*-- hope you will be, too!

Cohort 3 (2013-14 school year): We are looking forward to the final field test of the pilot version of National Geographic's online materials. We hope to find clusters of teachers who would like to teach Carbon TIME units together, so please share our recruitment flyer (link on page 4) with any colleagues who might be interested!

--Andy

What's happening at National Geographic?

We are continuing to work with NGS to prepare the units for the NGS education website. Right now we're working to revise the Systems & Scale unit. This is a lot of work, but it sure is fun to see the units online. We're also beginning to write story boards for videos that will be produced to show teachers and students how to conduct the investigations. This is just in beginning stages, but we're excited!



Carbon TIME Show and Tell

What do MSU researchers do with all the data teachers send in?

Teachers play an incredibly important role in data collection for the Carbon TIME project: you pilot teaching materials and help in the revision process, you interview students, you video classes, and you collect student written responses. Do you ever wonder what we do with all that data?

Mainly, we use the data to track student learning over time. We do this so we can 1) evaluate student learning, 2) to revise the units, and 3) understand more about the kind of practices that help students move up in our learning progression levels.

Jennifer Doherty uses the data to make graphs (like the two above). In these graphs, each bar represents the students in one teacher's classroom. If a bar has a lot of blue, that means most student answers in that class are Level 2s. Notice that in the post test graph (right), there is more green than in the pre test graph (left). This tell us there were more Level 4s (green) after you taught the units than there were before. This is exciting evidence of student learning. Yay, teachers!

Once we have evidence of student learning, it is or responsibility as researchers to share what we have learned with the research community. There are a few ways we do this. One way is by presenting our findings from the Carbon TIME project at conferences, like the National Association for Research in Science Teaching (NARST) conference.

To prepare for the conference, we write reports that summarize what we have learned from the Carbon TIME data. This year we'll have four reports. We try to organize the information so that it will be interesting to other researchers. This can be very challenging, because there are lots of data. Once we have our reports written, we create very short (12 minute) presentations to explain the research to people who will come to our show-and-tell. Andy says that this step is important because "it forces us to organize our thinking about talk about what we're learning in a concise way… sometimes after a presentation we will say 'Gosh, we sure explained that a lot better than we did in the teacher's guide' and then we know what kinds of revisions to make."

Another important part of the conference is getting to listen to other people's research. Jiwon Kim, a Carbon TIME graduate student, likes attending because "there are lots of different sessions and I can learn about different types of research. This opens my eyes to new things. Also, as a student I also get to see famous people."

As it turns out, Andy is pretty famous at this conference, which means lots of people come to hear our presentations. This puts the pressure on: we have to make sure our presentations meet the standards of our toughest critics in the research community. They aren't shy, and ask a lot of questions!

Jennifer Doherty likes participating in the research conferences for two reasons: "One, I like conversing with people about our work and getting ideas about what we've learned. Two, I like going to sessions and seeing what other researchers do. Sometimes I think 'Ooh, they do that with their teachers?! It would be great if we could do that, too.'"

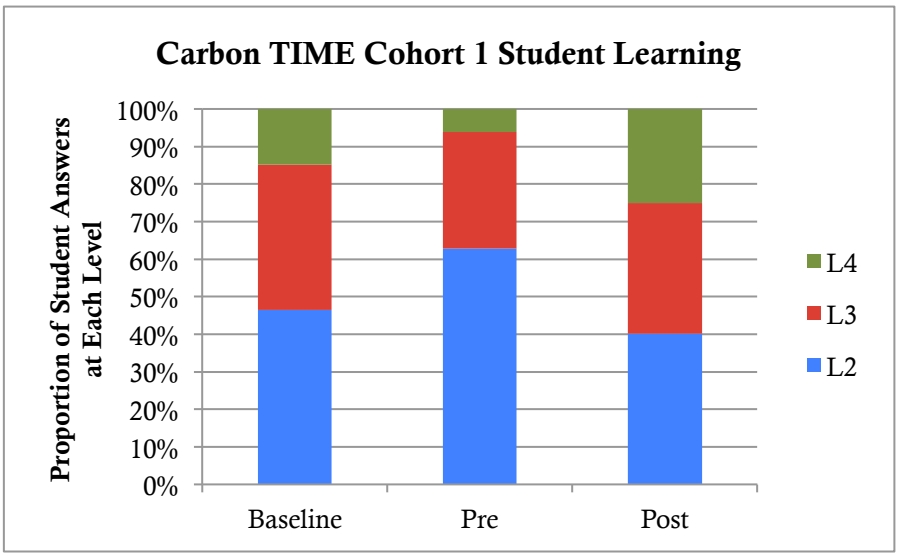
This year the conference is being held in Rio Grande, Puerto Rico. We're excited to take a trip to the home of the United States' only tropical rain forest (and also to get to hear what's new in science education around the world, of course). We'll be sure to let you know how it goes. Wish us luck!

Reminders & Things

- If you are teaching the plants unit and would like instructions on how to dilute the nutrient supplement, you can find instructions here: http://hydrodynamicsintl.com/ionicgrow.htm. We also added this link to the new teacher's guide, which was just updated on the website on Feb 25, 2013.
- Remember to sign up with Staci before April 1, 2013 if you would like to participate in the 2013-2014 cohort.

Students are Learning!

Jennifer Doherty, our savvy number cruncher, has some exciting results to share from our 2011-2012 cohort. In addition to the graphs on the previous page, Jennifer has compiled all of the student data (no easy feat) into one simple graph that shows student learning during the 2011-2012 school year. Overall, this graph shows us that there is an increase in Level 4 thinking (green) in students who take Carbon TIME classes. This is exciting news for everyone in the Carbon TIME project. Congratulations!



What do the colors mean?

The color blue represents Level 2 student answers. If you look at the bar on the graph labeled "Pre," the blue part of this line shows us that of all the students all over the country who took the pre test, about 63% of their answers were Level 2s. If you look at the bar labeled "Post," you will see that there is much less blue, about only 40%. This means that a lot of the students who began the year giving Level 2 answers (blue) at the beginning of the year gave Level 3 (red) and even Level 4 (green) answers after the Carbon TIME units. Yay!

What does "baseline" mean?

Each bar on the graph above represents one round of tests. The line titled "Baseline" represents all students who took the test in Spring 2011 before you taught the Carbon TIME units (so this line tells us what the kids who *didn't* take the Carbon TIME units think about matter and energy at the end of the year). Having data from these students lets us compare the "Baseline" student answers to the "Post" student answers. From the graph, we can see that students who took the Carbon TIME units think about matter and energy at higher levels than those who didn't. This tells us the Carbon TIME units are helping students learn about matter and energy in socio-ecological systems. We use your feedback to make the units better, which will hopefully lead to gains in student understanding (i.e., more green!).

Spotlight on the undergraduate

Meet Melissa Jagos, a recent addition to our Carbon TIME team. Melissa is originally from West Bloomfield, MI and came to East Lansing to study mathematics in the residential Lyman Briggs College at MSU. Melissa is currently a junior-- after she is finished she plans to study science and math in graduate school.

Melissa works closely with Kathryn Oleszkowicz, Jennifer Doherty, and Andy Anderson to write coding rubrics for the large amount of student responses the teachers provide, and then code the data. This means she helps get the data ready so Jennifer can make fancy graphs (like the ones on pages 2 and 3). Melissa says she likes coding because of the "logical and well-organized procedure of using the coding rubrics to decide what the best code is for an item. I also like the challenge of thinking of how to code a response we haven't seen before."

Melissa has also been a die-hard Spartans fan her entire life.

Welcome, Melissa! Go green!

Carbon TIME important links

Testing Website and Dashboard:
http://ibis-live.nrel.colostate.edu/MSP/home.php

- Give feedback
- Order Materials
- Shipping information

Teaching Materials Website:
http://edr1.educ.msu.edu/environmentallit/publicsite/html/CarbonTIME.html

Facebook: Carbon TIME group
Twitter: @CarbonTIME

Archived Newsletters:
http://edr1.educ.msu.edu/environmentallit/publicsite/html/CarbonTIME_newsletter.html

Recruitment Flyer:
http://edr1.educ.msu.edu/environmentallit/publicsite/html/CarbonTIME1314.html

Carbon Comics