

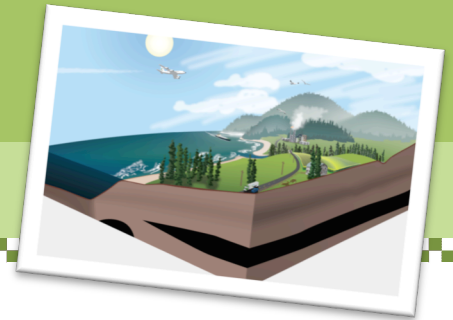
The



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

Carbon TIMEs

April 2013



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Andy's Message

Hi Folks-

This month we are looking forward to starting the work of Cohort 3, our last and largest field test cohort. We hope that many of you will be participating, so you can see all the improvements we have made with your help!

We are also looking forward to sharing some of our results from the Cohort 1 pilot work at the NARST (National Association for Research in Science Teaching) conference this month. You saw some of the learning data that we will be presenting in last month's newsletter. This month's newsletter has a summary about another of our NARST presentations--Hannah Miller and Allison Webster talking about Principle-oriented Level 3. Jenny Dauer will be presenting on what we are learning about students' inquiry practices, and Kathryn Oleszkowicz and Jennifer Doherty will be presenting about assessment item design. We will share more about these reports with you in the future!

-Andy

Deadline Extended

Any returning teachers from the Carbon TIME 2012-2013 cohort who would like to continue in the program but have not yet contacted Staci—good news! We have extended the deadline one week. Please email Staci (sharpst5@msu.edu) by April 8th if you would like to join the 2013-2014 cohort.



The Many Faces of Level 3...

A highlight on one of the upcoming NARST presentations

As many of you know, some of the Carbon TIME research crew is going to Puerto Rico in early April for the NARST (National Association of Research in Science Teaching) annual conference. Many of us are preparing to present some of the research from the Carbon TIME project. In the next few issues of the newsletter, we will highlight some of these NARST presentations. In this issue, we want to tell you about our paper about Level 3 students.

Hannah, Allison, Jenny, and Andy will be presenting the findings from a paper called “Alternative Learning Trajectories Toward Understanding Matter and Energy in Socio-Ecological Systems.” In English, that means “There are lots of ways to get to Level 4: Here are two different ways we think students might get there.”

Here’s our idea: based on interviews we did with MSU undergraduates, we think there are two “types” of Level 3 students. We’re calling these two types “Principle-oriented Level 3” (PL3) and “Fact-Oriented Level 3” (FL3). We argue that PL3 students consistently follow the “rules” of matter and energy, and use them as a reasoning framework to help understand and explain scientific phenomena. For example, if we asked a PL3 student where the heat energy in a flame comes from, she would use the laws of conservation of energy to try to figure out the answer, even if she

Alternative Learning Trajectories Toward Understanding Matter and Energy in Socio-Ecological Systems

Hannah Miller, Allison Webster,
Jenny Dauer, Andy Anderson



doesn’t know all the details of what is happening in the flame. FL3 students, on the other hand, think of the rules as “facts” in the long list of facts they have to memorize for science class (they don’t use them as a reasoning framework to help understand the world). Because of this, FL3 students might state the rules as “facts” in some context, but then break the rules in other contexts, like when explaining scientific phenomena they don’t understand.

It is our hypothesis that PL3 students are in a better position to move to Level 4 than FL3 students. We want to try to figure out how to help Level 2 students progress to PL3 instead of FL3, and what kind of instruction will help them do this. Next step: test the hypothesis with K-12 students. Carbon TIME data. here we come!

Congrats!

Congratulations to Hui Jin and Andy for a recent honor from the National Association for Research in Science Teaching (NARST) and the National Science Teachers Association (NSTA). Hui and Andy's article "A Learning Progression for Energy in Socio-Ecological Systems" was chosen as one of the top five articles of 2012 recommended for science teachers! This means that the article will go beyond the NARST readership and reach more classroom teachers.

If you are going to the NSTA conference in San Antonio this year, copies of the article will be available for science teachers at the NARST booth, and a link will be shared in the NSTA newsletter.

Congratulations, Hui and Andy!



Hi Ho, Hi Ho, It's Off To Code We Go

Do you ever wonder why we spend so much time reminding you to send in your pre and post tests? Without your data, we wouldn't be able to know if students are learning anything about carbon and energy. In order to figure out what they are learning, we first have to "code" all of the data. Here is a simple overview of how we code all of your student responses. It's a ~~simple~~ complicated process! Here's what happens:

1. If your students didn't do the assessment on the computer, David, our transcriber, tries to read your students' handwriting and inputs their responses into the computer.
2. Jennifer organizes all of the student data into excel spreadsheets. She organizes the data by question so it is easy to read.
3. Carbon TIME coders Melissa, Liz, Cara, Elizabeth, and Kathryn use a scoring rubric to code some of the student responses for each question. They read the responses and decide if they are Level 2, Level 3, or Level 4. Sometimes the responses don't make sense or are unrelated (these get different codes). This work can be **hard**: sometimes the answers don't fit into any of our categories. This work can also be **fun**: some of your students give funny answers.
4. After one round of coding, the coders, Jennifer, and Andy have a meeting to talk about patterns in the responses and revise the coding rubrics. If we don't get good responses from a question, we make changes and hope for better responses next time. Sometimes we get good ideas about student learning during these meetings.
5. Then a second round of coding happens. This time, the coders read all of the responses for a question and give each response a code (2, 3, 4, or other). This takes a while. To make sure we are all coding according to the rubric, two coders are assigned to each question.
6. Kathryn, our lead coder, then checks for coding reliability for each question: did the two coders agree at least 90% of the time? If not, we discuss the rubric, make some changes in the rubrics, and try again.

We keep going through this process until we feel confident we are learning something about how students progress from Level 2 to Level 4 reasoning. Thanks to all of the Carbon TIME coders for all their hard work. And thanks to you, teachers and your students, for collecting the data for us. None of this would be possible without you!

Spotlight on the science coach



Please join us in saying “Hello!” to MaryMargaret Welch, an instructional science coach for the Seattle Public Schools. MaryMargaret works with teachers in Seattle to help to improve their curriculum, practice, and assessments. This means she also spends time helping Seattle teachers use the Carbon TIME materials in their classrooms. When we asked MaryMargaret why she dedicates her valuable time working with Carbon TIME teachers, she said “[Carbon cycling and environmental literacy] are very important cross-cutting concepts that are critical for student understanding of important science ideas that they will encounter throughout their science learning.” We agree!

Not only is MaryMargaret connected to MSU through her work with the Carbon TIME project, she is also a graduate of the Lyman Briggs College (a residential college within MSU). Welcome, MaryMargaret-- we’re lucky to have you on our team!

Links You Need

Testing Website and Dashboard:

<http://ibis-live.nrel.colostate.edu/MSP/home.php>

- Give feedback
- Order Materials
- Shipping information



Find us on Facebook:
Email Staci
(sharpst5@msu.edu) to
request to join our group.



Follow us on Twitter:
[@CarbonTIME](https://twitter.com/CarbonTIME)

Carbon Comics



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

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

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