

Carbon TIME Professional Development Course of Study Goals, Modules & Timing

This document accompanies the [Carbon TIME Professional Development Course of Study](#), and outlines the four goals for teachers participating in a suggested professional development course of study, along with suggested organization and timing.

Professional Development Goals

Carbon TIME has four goals for teachers participating in a suggested professional development course of study.

1. Understanding Three-dimensional Learning and *Carbon TIME*. The *Carbon TIME* curriculum and assessments are designed around learning progressions leading toward environmental science literacy for all students. Thus the teacher's role in the classroom includes assessing and scaffolding students' three-dimensional engagement with phenomena.
2. Preparing to teach *Carbon TIME* units through cognitive apprenticeship and exploring unit resources on the website.
3. Learning from classroom experiences and student work, including interpreting assessment results, analyzing student work, analyzing classroom discourse, etc.
4. Creating and sustaining supportive professional communities.

Achieving these goals involves acquiring a vision of and knowledge about *Carbon TIME* units (PD Modules 1, 2, and 3), applying that knowledge (teaching *Carbon TIME* units), and reflecting as a community on teaching and learning experiences that occurred during implementation of *Carbon TIME* units (Pd Module 4).

Professional Development Goals and Modules

The table below illustrates how modules and sessions, as well as teaching experiences, contribute to each of the four Professional Development Course of Study goals. Below this table, each module is described briefly.

Carbon TIME Professional Development Course of Study Goals				
	Goal 1: Understanding Three-Dimensional Learning and <i>Carbon TIME</i> Curriculum	Goal 2: Preparing to Teach <i>Carbon TIME</i> Units	Goal 3: Learning from Classroom Experiences and Student Work	Goal 4: Creating and Sustaining Supportive Professional Communities
Module 1	Establishes a vision for students' three-dimensional engagement with phenomena.	Establishes a foundational understanding of tools and practices designed to assess and scaffold students' three-dimensional engagement.	[Intentionally empty.]	Provides an opportunity for participants to develop a shared vision of three-dimensional teaching and learning.
Module 2	Models the teacher's role in assessing and scaffolding students' three-dimensional engagement with phenomena.	Models key <i>Systems and Scale</i> activities, which lay the foundation for all <i>Carbon TIME</i> units.	Identifies questions for teachers to ask themselves about indicators of students' success in the <i>Systems and Scale</i> unit.	Provides an opportunity for teachers to work together as a supportive, professional community to plan and enact <i>Systems and Scale</i> .

Module 3	Models key tools for assessing and scaffolding students' three-dimensional engagement with phenomena.	Models the use of key tools for other <i>Carbon TIME</i> units.	Identifies questions for teachers to ask themselves about indicators of students' success in other <i>Carbon TIME</i> units.	Provides an opportunity for teachers to work together as a supportive, professional community to plan and enact <i>Carbon TIME</i> units.
Time to enact (or apply) what teachers have learned in Modules 1, 2, (and 3) to Classroom Practice				
Things to do while teaching unit(s)				
<p>Teaching Practice assessing and scaffolding students' three-dimensional engagement with phenomena. Work on Teaching Practice enacting plans and using tools in classrooms.</p> <p>Collect data, including examples of classroom discourse and student work, to analyze and discuss.</p>				
Time to reflect and make modifications				
Digging Deeper Sessions	Coaches teachers toward developing more sophisticated and specific understandings of the 3-dimensional engagement around natural phenomena.	Coaches teachers as they use their combined knowledge to plan for intentional revisions in their teaching practice.	Coaches teachers as they learn from their teaching experiences and student discourse, work products, and assessment data.	Provides an opportunity for teachers to work together to determine ways in which to improve science teaching and learning in their local context.

Module 1: Introduction and Overview. Professional development experiences in Module 1 support teachers in understanding three-dimensional learning as well as how *Carbon TIME* has been designed to engage students in such learning. It provides teachers with the purpose and rationale for the common investigation tools and scientific practices across *Systems and Scale*, *Animals, Plants*, and *Decomposers* as students engage with the driving phenomenon and questions for each unit. Synchronous professional development provides an avenue for teachers to create a learning community and develop a shared vision for three-dimensional learning and *Carbon TIME*, which can be sustained throughout the study and implementation of *Carbon TIME* units.

Module 2: Systems and Scale preparation. Facilitating students in their roles as three-dimensional learners is a big shift for many teachers. Module 2 is designed to help teachers navigate these shifts. As you can see in the Module 2 row, teachers are provided with an opportunity to better understand the teachers' role in assessing and scaffolding students as they engage as questioners, investigators, and explainers. Teachers engage with some of the most critical and common *Carbon TIME* Tools and investigations; that is, they examine and complete each of the four Process Tools (Expressing Ideas and Questions Tool, Predictions and Planning Tool, Evidence-Based Arguments Tool, and Explanations Tool). Teachers begin to examine student expectations and indicators of student success for each of these Tools. Synchronous experiences provides an opportunity to sustain the learning community.

Module 3: Preparing to teach other units. After teachers have engaged in-depth with the *Systems and Scale* unit during Module 2, their experiences in Module 3 focus on successful planning for and implementation of additional units. As outlined in the Module 3 row, teachers review their role in assessing and scaffolding student learning and they engage with key *Carbon TIME* unit Tools. Teachers review student expectations and indicators of student success for each of the Tools. Again, synchronous experiences provide an opportunity to sustain the learning community.

Teaching experiences and professional support networks: The professional development course of study is designed so that teachers implement the *Carbon TIME* units in a way that involves

reflective practice and collection of student data. These teaching experiences are necessary in-between Module 2 and/or Module 3 and the Module 4 Digging Deeper sessions.

Module 4: Reflecting on teaching and digging deeper. An important step in developing teachers' practice toward supporting students in three-dimensional engagement with phenomena is the opportunity for teachers to share their combined knowledge of implementing the units and plan for intentional revisions based on what they have learned through their teaching experiences. Module 4's Digging Deeper Sessions are designed to coach teachers in using classroom and student data to drive responsive instruction and scaffold future three-dimensional learning. The synchronous experiences provide an opportunity for teachers to work as a community to determine ways to improve science teaching and learning for implementing future *Carbon TIME* units.

Professional Development Course of Study Sequence and Timing

Each session in the *Carbon TIME* Professional Development Course of Study is designed for implementation in about 3 hours, so each can be thought of as a half-day unit.

Module 1: Vision & Common Inquiry Tools	Module 2: Systems & Scale In Depth	Module 3: Unit Highlights & Planning	Digging Deeper Sessions (used flexibly after teaching experiences)
Session 1.1 – <i>Carbon TIME</i> Vision and Investigation Tools (3 hours)	Session 2.1 – Introductory Activities (3 hours)	Session 3.1 – Animals & Decomposers (3 hours)	Reflecting on Teaching (3 hours)
	Session 2.2 – Inquiry Activities (3 hours)	Session 3.2 – Plants (3 hours)	Rigorous and Responsive Classroom Discourse (3 hours)
	Session 2.3 – Explanation Activities and Activity 5.3 (3 hours)	Session 3.3 – Ecosystems & Human Energy Systems (3 hours)	Studying Student Work (3 hours)
			Purposes of <i>Carbon TIME</i> 3D Assessments (3 hours)

Sample two-year Schedule

- First Summer: 2 full days or 4, ½ days: Module 1 and Module 2
- Teaching Experience: Teach *Systems & Scale*
- Early Fall: 1 full day: Reflecting on Teaching and Session 3.1 (*Animals and Decomposers*)
- Teaching Experience: Teach *Animals and Decomposers* and collect student work
- Late Fall: 1 fully day: Digging Deeper Studying Student Work and Session 3.2 (*Plants*)
- Teaching Experience: Teach *Plants* and record student discourse
- Winter: 1 full day: Digging Deeper Rigorous and Responsive Classroom Discourse and Session 3.3 (*Ecosystems and Human Energy Systems*)
- Teaching Experience: Teach *Ecosystems and Human Energy Systems*
- Second Summer: 1 full day, Reflecting on Teaching and Purposes of *Carbon TIME* 3D Assessments
- Second School Year: 1 full day, continued digging deeper