



**CU's Science Education Initiative (SEI)** is a 5-year, \$5M investment by President Benson and Chancellor DiStefano to catalyze and support significant, sustainable improvements in undergraduate science education. Directed by Nobel Laureate Carl Wieman and Kathy Perkins, the SEI funds departments to take a four-step, scientific approach to undergraduate education:

- 1) Establish what students should learn;
- 2) Scientifically measure what students are actually learning;
- 3) Use instructional approaches guided by research on learning and data on student thinking and learning;
- 4) Disseminate and adopt what works.

### SEI Supports

**Departments**  
 5 funded: IPHY, PHYS, MDCB, GEOL, CHEM

**Faculty**  
 >100 faculty use SEI-funded resources  
 <75 faculty modified thier teaching

**Students**  
 Changes in >50 courses  
 Impacts >10,000 students/yr

### Faculty partner with Science Teaching Fellows to Transform Courses

#### Develop consensus learning goals

- Faculty work together to articulate explicit learning goals for courses.
- Shift from topics to outcomes: "What students should be able to DO at the end of the course?"

**What should students learn?**

#### Use data to support & guide faculty efforts

Probe student thinking and learning with:

- Student Interviews
- Observations
- Surveys
- Analysis of student work
- Conceptual pre/post assessments

**What are students learning?**

**Science Teaching Fellows (STFs) & Faculty**

#### Develop or adapt approaches supported by research and aligned with learning goals

- These are:
- Aligned with research on learning
  - Actively engage students
  - Guided by knowledge on student thinking.

**Which instructional approaches improve student learning?**

#### Faculty are...

- Communicating explicit learning goals
- Attending to motivation
- Making lecture interactive with concetp tests, in-class activities, and classroom discussion
- Adding or modifying homework, labs, and recitations
- Conducting and publishing research on student learning

**Reference:**

**Transforming Science Education at Large Research Universities: A Case Study in Progress.**  
 By Carl Wieman, Katherine Perkins, and Sarah Gilbert, Change Magazine, 2010.

For more information visit:  
[www.colorado.edu/sei](http://www.colorado.edu/sei)