

# Defining Active Learning

## Day 1 Learning Objectives

- Describe the principal characteristics of active learning
- Discuss how active learning practices were incorporated into courses at two different institutions
- Become familiar with where to find exemplary teaching and learning resources as models for course materials

## EXPLORATION ACTIVITY

Three instructors taught an introductory physics course during the same semester.

- Prof. A emphasized concepts, careful, logical presentations;
- Prof. B used demonstrations and took extra preparation time;
- Prof. C had a problem solving emphasis.

All used the same textbook and covered the same chapters. All professors received similar evaluations. Pre-test scores on a validated standardized test for each class were the same.

**Predict which (if any) professor's class showed the greatest gain in post-test score.**

Holloun, L.H. and D. Hestenes, *American Journal of Physics*, 1986, 53(11): p. 1043-1058.

**Predict which (if any) professor's class showed the greatest gain in post-test score.**

- A. Professor A
- B. Professor B
- C. Professor C
- D. No difference

What was the definition of active learning as presented by Bonwell & Eison (1991)?

- A. Instructional activities that involve students measuring their learning compared to a defined standard
- B. Instructional activities that present key lesson materials in a well-designed logical sequence for student review
- C. Instructional activities involving students in doing things and thinking about what they are doing
- D. Instructional activities that involved students participating in authentic-style research experiences

Charles Bonwell & James Eison, 1991  
Active Learning: Creating Excitement in the Classroom,  
ASHE-ERIC Higher Education, Report No. 1

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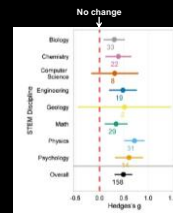
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## What is Active Learning?

### Our Working Definition:

1. Students participate in classroom activities (either "Doing" or "Observing") in addition to/instead of listening to direct instruction;
2. Activities provide opportunities for student reflection on learning or facilitate student/instructor interaction and assessment of learning;
3. Peer-to-peer interaction occurs as students complete the activity.

## Active Learning vs. Traditional Lecturing



1. Failure rates (DFW) in active learning classes less than in traditional format, 34% → 22% (n=67 studies; 29,300 students)

3. Helps all students, reduces performance gaps



2. Students in active learning classes out-performed those in traditional classes by ~6% on exams (n=158 studies)

Wierman, 2014, Proceedings of the National Academy of Sciences 111, 8219-8220.

## Active Learning Resources in the Geosciences

