

Active Learning Tip Sheet

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What is active learning?

- A process in which students are actively engaged in learning.
- Almost any activity, preferably one that is cooperative and with timely feedback, that requires students to recall, think about, apply, and verbalize concepts.
- As students participate in these activities, they construct new knowledge and build new skills.

Examples of Active Learning Strategies

From Scientific Teaching. Handelsman *et al.* 2007

Also see [ABL Connect](#) for more types of activities and more information.

- One-minute paper: Students write a short answer (about one minute) in response to a prompt during class, requiring students to articulate their knowledge or apply it to a new situation.
- Think-Pair-Share: Students are asked to think about possible answers to a question individually and then discuss them with a partner. Students then share their ideas with the rest of the class in a group discussion.
- Concept map: This activity helps students understand the relationship between concepts. Typically, students are provided with a list of terms. They arrange the terms on paper and draw arrows between related concepts, labeling each arrow to explain the relationship.
- Group-work problem solving: Whether solving problems or discussing a prompt, working in small groups can be an effective method of engaging students. In some cases, all groups work on or discuss the same question; in other cases, the instructor might assign different topics to different groups. It is useful for groups to share their ideas with the rest of the class – whether by writing answers on the board, raising key points that were discussed, or sharing a poster they created.
- Brainstorming: The instructor elicits responses from a large audience and aggregates them into a single list. This provides the instructor and the students with an overview of the group's collective knowledge.
- Strip sequence: Students are given a set of strips of papers (or printed stickers or post-it notes) each with an event on it. Students place the events in order. As variations, the instructor could ask students to explain what happens during particular steps, or to add missing steps.
- Case study: In a case study, students apply their knowledge to solve a problem in a real life scenario, requiring students to synthesize a variety of information and make recommendations.

- Statement correction: Students evaluate what concepts are misrepresented in a text or in a diagram and then determine what information they need to correct it.
- Polling or clicker questions: Students respond to a multiple-choice question either using software (such as Poll Everywhere, Learning Catalytics, or Turning Point), or by holding up numbers of fingers or colored index cards with numbers on them. An effective strategy with polling is to ask students to vote on their own, and then discuss with a neighbor and re-vote.
- Jigsaw: Small groups of students each discuss a different reading or tackle a different aspect of a question. Students are then shuffled such that new groups are comprised of one student from each of the original groups. Each student is responsible for sharing key aspects of the original discussion. The second group must synthesize and use all of the ideas from the first set of discussions in order to complete a new or more advanced task.

Strategies to encourage student participation in active learning

Instructors sometimes worry that students will be resistant to active learning. The ideas below suggest strategies that encourage active learning, and also enable the instructor to receive feedback and make improvements.

From Seidel, Shannon B., and Kimberly D. Tanner. “What if students revolt?”—Considering Student Resistance: Origins, Options, and Opportunities for Investigation. *CBE-Life Sciences Education* 12.4 (2013): 586-595.

- Explain to your students why you are teaching the way that you are.
 - You might do this at the beginning of the semester, and you might return to it throughout the semester.
- Foster a positive relationship with your students.
 - Learn your students’ names. Smile. Make eye contact. Move around the room, decreasing the distance between yourself and your students.
 - Students will be more likely to respond favorably to you and will be more motivated to learn from you!
- Structure student groups to maximize positive interactions.
 - Keep group size small. Often groups of two or three people work well. In smaller groups, each student is more likely to participate and group dynamics are less complex.
 - Limit the scope of group projects. Don’t keep the same group together for an entire semester. Mix up groups on a regular basis.
 - If students work extensively in a group, provide a mechanism for students to provide peer evaluation of group work.
- Develop and use rubrics to grade student work.
 - This will minimize perceptions of unfairness.
- Use a variety of teaching strategies.

- Give students a mechanism for providing feedback about the learning environment. Methods might include:
 - Minute paper or index card. Ask your students to respond to an open-ended question about the class or about an activity.
 - On-line multiple-choice questions.
 - Keep, quit, start cards. Ask you students to respond to the following: To support your learning in this class, please propose one thing that you would suggest that I (the instructor) keep doing, one things to quit doing, and one thing to start doing.

Additional Tips for Active Learning

- Don't try to do too much! Active learning takes time.
- Choose activities that will help the students learn the material and master important skills. Don't choose activities just for the sake of doing something active.
- When student are working in small groups, walk around, listen to the students, ask questions, and guide them in the right direction.
 - If you notice that students are struggling with a particular issue, you might want to gather everyone's attention to add a clarifying comment or work through an example problem on the board. You don't want a lot of students to struggle for too much time, as this becomes discouraging.
- Make sure to give all of the necessary instructions before distributing materials and telling people to break into groups or find a partner. Otherwise, the students start talking to find a partner, or start looking at the materials, and it is hard to regain their attention to give the directions.
- Write down the instructions for any activity - on a slide, on the board, or on a handout. In case someone wasn't paying attention briefly, or in case there are multiple steps to the instructions, it is much easier if the students have written instructions to refer to.
- It can be nice to randomize students so that they work with a variety of people and you mix up students from different backgrounds. You can do this in a variety of ways - birthdays, random numbers, pick a card from a deck of card (with pairs of numbers).
- You may wish to assign reporters for group work.
- Include time to debrief the activity. A variety of approaches can be successful, and may vary depending on the subject matter.
 - The instructor might ask students to share answers. For quantitative work, students might write on the board or post their work (e.g. large sticky pads) on the wall.
 - The instructor might write/draw answers on the board or present a PowerPoint slide that explains possible answers.
- How do you ensure that all students in a group know what is going on? Below are a few suggestions:
 - Let the students know in advance that each member of the group may be responsible for sharing their answers or thought process with the class. You could

- designate who this person will be (e.g. the person whose last name is first in the alphabet, or who has the next birthday).
- You could rearrange the students and have students teach each other about what they just discussed, so each student needs to be responsible for understanding the material.
 - Ask a follow-up question that each student responds to individually. This could be a multiple-choice clicker (or polling) question for immediate feedback, or it might be a minute paper or other written answer.
- Include time for students to write during class. After you ask a question, giving students a minute to jot down a thought forces all students to engage with the material.

Additional references and resources

[ABL Connect](#): A repository of active learning activities and resources.

Freeman, Scott, et al. "[Active learning](#) increases student performance in science, engineering, and mathematics." *Proceedings of the National Academy of Sciences* 111.23 (2014): 8410-8415.

Paul, Annie Murphy. [Are College Lectures Unfair?](#) New York Times. Sept 12, 2015.

Tanner, Kimberly D. "[Structure matters](#): twenty-one teaching strategies to promote student engagement and cultivate classroom equity." *CBE-Life Sciences Education* 12.3 (2013): 322-331.