Active Learning Tip Sheet
By the Bok Staff

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

Anonymous Cards - Student write questions about course material on index cards, which are distributed to other students. Each student researches the question that they received, and then shares what they have learned with the rest of the class.

Brainstorm - Students call out answers to a question, and the instructor or another student records the ideas on the board. This provides the instructor and the students with an overview of the group's collective knowledge.

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.

Circle of voices - Students form groups of four to six students. The instructor poses a question. Each student takes a turn sharing their ideas with their group, going around in a circle so that every student participates. At the end of the activity, a reporter shares conclusions or themes with the entire class.

Collaborative note taking - The instructor pauses during lecture/class and asks students to take a few minutes to summarize in writing what they have just learned and/or consolidate their notes. Students then exchange notes with a partner to compare; this can highlight key ideas that a student might have missed or misunderstood.

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.

Debate - Students are assigned to two groups, where each is responsible for researching and defending a position contrary to the other group.

Gallery Walk - The instructor writes several different questions or prompts on large pieces of paper at different locations around the room. Groups of students write down responses to a particular question, then rotate to the next question and add responses. At the end of the activity, each group summarizes and shares the responses to their last question.

Graffiti Board - Using pictures, words, or phrases, groups of students respond to prompts that the instructor wrote on large pieces of paper. Students might rotate to new "graffiti boards" and contribute additional responses.

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.

Interpreted lecture - The instructor pauses during lecture, gives students 30 seconds to reflect on the recent content, and then asks a student to rephrase the content that was just discussed. Other students can be invited to contribute additional or clarifying ideas.

Jigsaw - Small groups of students each discuss a different, but related topic. Students are then shuffled such that new groups are comprised of one student from each of the original groups. In these new groups, each student is responsible for sharing key aspects of their 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. A nice feature of a jigsaw is that every student in the original group must fully understand the key ideas so that they can teach their classmates in the second group.

Minute paper, or quick write - Students write a short answer in response to a prompt during class, requiring students to articulate their knowledge or apply it to a new situation.

Panel Discussion - Individuals or small groups research a particular topic, and then participate in a panel discussion in which they briefly present their key findings and answer questions on that topic generated by the rest of the class.

Polling - During class, the instructor asks a multiple-choice question. Students can respond in a variety of ways. Possibilities include applications such as PollEverywhere or Learning Catalytics. In some courses, each student uses a handheld clicker, or personal response device, to record their answers through software such as TurningPoint or iClicker. Alternatively, students can respond to a multiple-choice question by raising the appropriate number of fingers or by holding up a colored card, where colors correspond to the different answers. A particularly effective strategy is to ask each student to first respond to the poll independently, then discuss the question with a neighbor, and then re-vote.

Responsive lecture - Students work in groups to generate, and rank, questions based on course material (perhaps from lecture, a reading, or an out-of-class activity) for the instructor to answer. Each group submits their questions. After class, the instructor reviews and organizes the questions, and then responds to the top-ranked question at the next class.

Snowball – The instructor provides an initial question to the entire class. Students think about the question individually and then discuss with a partner. Two groups of pairs join to form a group of four; this group responds to a more complex question that builds on the initial question. If desired, this process can continue, with two groups of four creating a group of eight students, who work on yet another extension of the topic. At the end of the activity, each group summarizes their conclusions to the class.

Speed interviews – The instructor designs a thought-provoking question or set of questions. In pairs, students take turns interviewing each other for a few minutes, and then rotate to a new partner.

Statement correction, or intentional mistakes - The instructor provides statements, readings, proofs, or other material that contains errors. The students are charged with finding and correcting the errors. Concepts that students commonly misunderstand are well suited for this activity.

Strip sequence, or sequence reconstruction - The goal of this activity is for students to order a set of items, such as steps in a biological process or a series of historical events. As one strategy, the instructor provides students with a list of items written on strips of paper for the students to place in order, or to sort. Removable labels with printed terms/concepts also work well for this activity.

Think-pair-share - 1) Students are asked to think about a question on their own, and perhaps respond in writing. 2) Students discuss their thoughts in pairs or small groups. 3) Individuals share their answers or ideas with the full class.

Visible classroom opinion poll – The instructor poses a controversial question. Students indicate their opinion by moving to an identified part of the room. Students with similar opinions form groups, discuss their rationale, and then a spokesperson shares key ideas with the class. The instructor could poll students to see if their opinion has changed.

Activities are drawn from Teaching for Learning: 101 Intentionally Designed Educational Activities to Put Students on the Path to Success by Major, Harris, and Zakrajsek; Scientific Teaching by Pfund, Handelsman, and Miller; and others

Also see ABL Connect for additional types of activities, research about the strategies, and examples.

Tips for Teaching with 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 students 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, 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 requires all students to engage with the material.

Additional 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. 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. Group size will vary depending on the type of activity. For problem solving, groups of two or three people work well. For discussion-based activities, you may wish to use groups of 3-6 students. 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 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.