

# Active Learning Strategies

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**Active Learning Strategies help to initiate learners and faculty into effective ways to help learners engage in activities based on ideas about how people learn. Multiple active learning strategies may be used in each of the active learning designs. Here's an annotated list of active learning strategies.**

## **I. Sit and Talk with Peers**

### **Think-Pair- Share.**

1. **Define “Think-Pair-Share.”** Explain to students that a Think-Pair-Share allows them to activate their prior knowledge and share ideas about content or beliefs with peers. This structure gives students a chance to organize their ideas—first in their own minds, then in a smaller group setting before sharing with the entire group. In a Think-Pair-Share, students Think individually about the question or idea(s) put forth, Pair up with someone to discuss their thinking, and then Share their conversation with their table group, and then finally with the whole group.

2. **Display Think-Pair-Share prompts about a concept or topic.** Give students 1-2 minutes to think about the prompt on their own. Then discuss with a partner for another few minutes.

### **3. Facilitate a whole group discussion.**

- Listen to their responses.
- Ask students to elaborate on their thinking by providing explanations, evidence, or clarifications. Suggested probing questions:
  - What makes you think that?
  - Please give an example from your experience.
  - What do you mean?
- Try to stay neutral in your reaction to students' comments.
- Invite others to react and respond to ideas by providing alternative viewpoints, agreements or disagreements. Suggested probing questions:
  - Can anyone add something to that comment?
  - Who would like to share an alternative opinion?

## **Quick write**

A prompt is posed for students to respond to in writing. Taking only 5 minutes or so, this is a quick way to accomplish one or more of the following: determine whether or not students have done the homework assignment, engage students in thinking about the topic that will be covered in the session, provides the opportunity for students to access their prior knowledge on a topic. The quick write can be graded to encourage students to do their reading assignment or collected to serve as an attendance check.

## **Turn and Talk**

In a turn and talk, a question is posed to the class and students simply turn to the person next to them to discuss. This can serve as a comfortable way for students to share their ideas with others and set the stage for them sharing with the larger group. The instructor doesn't need to hear all (or any) of the ideas shared– the important aspect of this strategy is for the peers to share and for individuals to access their prior knowledge about a topic.

Example prompt: Ask students to turn to someone next to them and discuss their responses to the following question. Tell them to take two minutes to discuss this with their partner with each person getting some time to talk.

- Part of the challenge of communicating climate change with the public is that there is disparity between what scientists and the non-scientist public think and know about climate change.
- Why do you think there is such a disparity?

## **Polling**

Having students vote anonymously on what they perceive as the best explanation/answer to a question followed by opportunities to discuss their ideas with peers, and then to vote again leads to greater learning of the material. It is important to have students discuss why they think their explanation is the most accurate and also why the other explanations proposed are not accurate. It is also important that the teacher looks at the polling results and listens to the reasoning of the students in order to determine what further explanations and summary might need to be made in lecture. There are various tools that can be used for polling, including Clickers, Socrative.com and Poll.Everywhere.com.

## **Individual plus Group Quizzes**

Give students a quiz that they complete individually and turn in to be graded. Immediately following the individual quiz, put students in small groups and have them take the quiz again, but this time they discuss the answers in their group and turn it in for a group score. Both quizzes are graded and if the group score is higher, the two grades are averaged. The group score can't hurt someone if they have a higher individual score. This encourages individual accountability, and also helps students to better understand the material as they discuss it with peers. In this way, they keep up with the material, rather than realizing they don't totally understand it when they reach the midterm.

## **Tests/Quizzes with common preconceptions as distractors**

Design assessments to include common preconceptions (or misconceptions) that students often hold. Allow students to answer the question on their own and then discuss their answer and rationale with a partner. Have them answer the question again after the peer

discussion. Elicit a whole group discussion about why the correct answer is correct and why the others are not. Common misconceptions students have about STEM topics and concepts can be found at AAAS, and assessment questions including common misconceptions as distractors can be found at Braincandy.

### **Jigsaws**

Students work in small groups to read information that has been organized into sections. Each student in the group reads one section of the material and then shares that information with the rest of their group. As they read and share information, they refer to prompts such as: what do you think each idea means? What is the big idea? How can this idea be applied to help understand the concept(s)? What questions do you have about what you read? What do you agree/not agree with?

There are various permutations of jigsaws. One such model includes expert and cooperative groups: Each group can be assigned a particular aspect/part of the overall information – they read it individually and then discuss in their small “expert” group to make sure they all understand it. Then new “cooperative” groups are formed made up of one-two students from each of the original expert groups. In this way, the new groups have an “expert” representative from each of the original groups so that all of the information is now represented in the new cooperative group. The “expert” has had a chance to practice sharing and hearing other viewpoints about the information in their original group, and therefore likely feels more comfortable sharing in the new group.

### **Sorting strips**

Small bits of information are separated into strips so that students can sort the strips into various categories or organize them into a sequence depending on the topic. This strategy encourages discussion of competing ideas or organizations or order in which a process would take place. In this case, it is often the discussion and sharing of ideas that is the most important outcome of the activity.

### **Partial Outlines/PPTs provided for lecture**

Research has shown that students have a better understanding, do better on exams, and stay more engaged with the content during lecture when they are provided with partial, rather than complete lecture notes or PowerPoints.

### **Pausing in lecture**

These strategies work towards inserting wait time in lectures for students to reflect on, discuss and apply ideas just presented and to encourage them to engage actively in the lecture rather than passively taking notes. These strategies also help students to understand what they do and don't understand about the lecture.

- ask students to not take notes as you work through a problem on the board with the class, followed by 5 minutes for them to copy down board and discuss the problem/chemical reaction/process with peers
- pause 6-10 seconds after asking a question before calling on a student to respond have students do a quick write about a concept just covered in lecture (e.g. their understanding, two questions they have about the concept as presented, what they would like to know more about etc.); optional, collect the quick write to help you better

understand what they understood from the lecture and the questions they have and to keep them engaged

- turn and talks – ask peers to talk to each other about what they do and don't understand and/or share with each other what they wrote down in their notes about a particular concept just covered in lecture. Encourage students to add to their notes from the discussion
- have students apply their understanding of a concept just covered by working with a small group around a huddle board. Optional, have a few groups share their work and elicit reactions and reviews from other students. Summarize findings and scientific normative explanations.
- Have students do think-pair-shares, polling to keep their mind engaged in the topic and to share their ideas with their peers for greater meaning-making opportunities.

## **II. Requires students moving around**

### **Posters & gallery walk**

Give groups of students an assignment that they need to work on together and present their ideas on a sheet of chart paper. Once they have completed their poster, have them display it on the wall, much like at a scientific poster session. One of their group will stay with the poster and help to explain it as the class circulates to look at all of the posters. Students take turns standing by their poster so that each of them has the chance to visit the other groups' posters. This sets up a more interactive way of presenting as compared to ppt presentations.

### **Fish bowl**

A fish bowl allows a small group of students to engage in a discussion about ideas or concepts that have alternative explanations while the rest of the class observes and takes notes. An inner circle of students engages in the discussion, while the rest of the class either sits in an outer circle or remains in their regular seats and observes. If you have your class organized into small groups, then the members of each group can tap their respective teammate and replace them in the inner circle to expand on or provide additional evidence to support an explanation. Optional: the entire class needs to take part in the inner circle conversation by the end of the class period.

### **Idea line up**

The idea line up is a structure that allows a teacher to use the diversity of perspectives in the classroom to generate heterogeneous groups of students for discussion. This diversity of thinking is a good place from which to develop a classroom climate that supports argumentation. More student-initiated science talk happens when students are connected with peers who have opposing perspectives (Clark & Sampson, 2007). The question should be one about which students have enough prior knowledge/experience to have some evidence to bring to bear in the discussions which ensue.

*How it works:* The teacher provides a question that (s)he knows may have a continuum of responses, especially if it is asked prior to collecting significant amounts of evidence or

before students have the opportunity to synthesize the evidence they have already collected.

The question is displayed prominently for students to consider. Students are directed to position themselves on a line to indicate their level of agreement in response to the question. After the students line up, have students talk to the person next to them so they can clarify their own thinking on why they positioned themselves on the line in a particular spot.

Student positions on the line typically indicate a diversity of thinking. The teacher can then use their positions to form groups of students with differing ideas about the question. Students then discuss their thinking and reasoning for their responses with the peers with whom they have been matched. Students should be prompted to listen carefully to each other's claims and evidence and respond with evidence to counter or support the claims of other students in their group. A group claims and evidence chart or small whiteboards can be used to collect student thinking.

If the activity is used prior to an investigation, students can use the ideas from the initial discussion to continually weigh against the evidence they gather from their investigations. If the activity is used after an investigation, but prior to a whole-group meaning-making discussion, ideas from the small group discussions can be used to prepare for a whole group discussion.

### **Four corners**

Four corners is used for the same reasons as the idea line up. The only difference is that students are considering several claims (responses to a question). For example, a teacher might ask, "Where does most of the mass in a plant come from?" Claims for consideration might include, "soil," "air," "water," and "sunlight."

*How it works:* The teacher displays the question prominently for all to consider. Each corner of the classroom is assigned one claim, also prominently displayed. Students are asked to go to the corner of the classroom that has the claim they agree with most. If they think more than one answer is correct, they should just pick one of the corners they agree with. If they don't agree with any claims, they should go to the middle of the room. Once in their corners, students should discuss with others why they chose that corner to help clarify their thinking. Have them share and record evidence that supports that claim and why the other claims are not supported. Optional: have them visit the other corners to see what others thought about the ideas and the evidence they put forth.

Just as in the idea line up the teacher can use the student positions around the room to form groups with a diversity of ideas. The rest of the instructions are the same as for the idea line up.

For information about incorporating technology into your class, which can help with the incorporation of active learning strategies, check out [Incorporating Technology into Your Teaching](#).