Active Learning: Mind Maps, Minute Papers, Jigsaws and More

Active learning promotes critical thought, collaboration, and engagement with course materials. Students are asked to set memorization aside, in order to share ideas with colleagues, analyze an argument, and apply theories to real-world situations. We will explore techniques that encourage discussion, problem solving, and critical analysis. Whether your course is a large lecture section or a small seminar, you will benefit from these ideas to increase student participation.

Students learn facts, definitions, concepts, formulas, etc. (20 mins)

Focused listing*
This can be warm-up activity or a think/pair/share for the end of class to make sure students got important parts of the lecture (ex. Economics 101: What variables can affect demand for a product? Or how many verbs related to movement can you name in French?)

Minute papers and muddiest point
What was the most important thing you took away from the lecture today? What do you feel you still don’t understand? These are useful for feedback at the end of a class session and can be addressed at the beginning of the next class. This is good for most disciplines.

Empty outline
Create an outline of your lecture, the assigned text, or movie, book, etc. Then remove the material you want them to concentrate on (subtopics, explanations) This can be group work before lecture about a reading or after a lecture or activity. Do not allow students to use any references while completing this task.

Peer instruction
Have students take a quick quiz, solve a few problems, or write a definition for a concept. Then pair up with a neighbor to compare, share, and learn/teach.

Students must categorize information and describe differences/similarities (10)

Categorizing grid* (see worksheet)
It is more useful for students’ to receive feedback on their learning when there are clear correct answers instead of too many fuzzy items.

Pro con grids
This forces students to go beyond memorization and weigh the value of opposing views. For example, we could list the pros and cons of the active learning classroom as a discussion topic.
Defining features matrix
Students must compare common connections and major differences between course content. Other examples could be government types (communism, democracy, socialism, tyranny) or parts of the brain. A variation would be for them to create their own matrix or add in one row or column.

<table>
<thead>
<tr>
<th></th>
<th>live births</th>
<th>warm-blooded</th>
<th>scales</th>
<th>skeletal system</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mammals</td>
<td>+</td>
<td>+</td>
<td>-</td>
<td>+</td>
</tr>
<tr>
<td>Fish</td>
<td>-</td>
<td>-</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Reptiles</td>
<td>-</td>
<td>-</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Birds</td>
<td>-</td>
<td>+</td>
<td>-</td>
<td>+</td>
</tr>
</tbody>
</table>

Students need to distill large amounts of information to a few key ideas (5 mins)

One sentence summary
Who does what to whom, when, where, how and why? Students must move from chunks of information to a full sentence. Giving a beginning word might be necessary (water - to explain conductivity for example) and it works best with a fairly limited scope (give a definition, describe a concept, describe a character).

*The Great Depression brought unemployment and famine to a large number of industrial nations in the 1930s, because economies worldwide collapsed after the stock market crash of 1929.*

One word journal
Students are asked to choose one word to describe a theme of a reading (causes of black holes), a central conflict in a work (family in *Hamlet*), or a core concept (gravity). They then have to provide an explanation for that choice. This works well as a sharing activity after being assigned as homework or can be used for an instructor feedback mechanism.

Students must organize and understand relationships between concepts (25)

Mind / Concept Maps* (see worksheet)
Organizing information to solve a problem
Visual display of a narrative / story
Classification of the characteristics of a person, place, or thing
Arranging the concepts of a chapter or lecture
Students must solve problems and justify their choices. (10 mins)

What is the best solution?
Present an open ended scenario/problem based on the concepts being studied and ask students to vote on one of several different solutions. Then arrange the students who chose the same solutions into groups. They then have to write a justification for their vote. Example: How do we best end world hunger? A. Economic aid B. Sustainable farming C. Better education D. Industrialization

What is the principle?
Provide several scenarios that can be explained by different theories or concepts discussed in the course. Then have students identify the appropriate principle that explains that scenario best and provide evidence or explanations.

Jigsaws
This group exercise works with any complex problem that can be broken down into components. In some cases, it might work best if you provide the readings from which to gather information or give them hints about the questions they need to answer. Assign each group an area in which to develop expertise as prep work. At the beginning of the class, give the groups time to analyze the information in-depth and compare notes. Then create new groups in which there is one member from each of the original groups. Now ask groups to solve a problem with each student weighing in with their knowledge. Finish with a written product or oral presentation by the groups.
Example: Assign groups different aspects of the Ebola crisis including the epidemiology and treatment of the disease, the social and medical reasons for outbreak of the disease in one African country, proper procedures for medical staff treating patients, and projections by the World Health Organization. When the new groups are formed, the question could be “How can we stem the Ebola outbreaks worldwide?”

Best practices (5 minutes)

What is think/pair/share?
Planning is key
Learning goals / ask yourself why!
Less is more
Use technology where it makes sense
Categorizing Grid

Under which category does each description of the classroom belong?

<table>
<thead>
<tr>
<th>Description</th>
<th>Active Learning Classroom</th>
<th>Traditional Classroom</th>
</tr>
</thead>
<tbody>
<tr>
<td>Instructors serve as a verbal textbook</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Students get frequent feedback on what they understand</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Students record knowledge</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Instructors facilitate and guide learning</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Instructors adapt teaching and delivery methods often</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Students learn concepts and facts by reading and listening</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Students are expected to solve problems and analyze concepts in class</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Instructors serve as the subject matter expert</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Follow-up examples:
Would you like to dispute one of the categorization?
Would you like to dispute the wording / meaning of a description?
Justify your answers. Why did you put it in that category?
Mind Map

**What are the roles of the student and instructor in the active learning classroom?**

With your group, create a mind map that describes the new roles of the instructor and students in the active classroom. You will have 10 minutes to talk about and draw your mind map. Be prepared to show / present your results after time is up.

---Feel free to use any types and sizes of shapes if you want to differentiate between ideas or emphasis the importance of one idea over another.

---Use solid lines to build off a single concept and dotted lines to indicate a secondary relationship between concepts (in this case something that students and instructors have in common)

---Use words sparingly. Don’t start building your concept map until you’ve been talking for a bit. The mind map should be a distillation of your discussion; not a note taking exercise.
Sources for this workshop


[Learner Centered Teaching: Putting the Research on Learning Into Practice](https://example.com), Terry Doyle, 2011.


More examples of Active Learning techniques

[50 Strategies](https://example.com) from the University of Minnesota

[More about CATs](https://example.com)

Mind Map Examples

[Mind Map Guidelines](https://example.com)

[Literature](https://example.com)

[Note taking: proteins](https://example.com)

Mind mapping software

An example of [chapter summaries](https://example.com) done in [Popplet](https://example.com)

[Coggle](https://example.com)

Add to [My Bakery](https://example.com) built in [MindMeister](https://example.com)