

# Metacognitive Study Strategies

Metacognition is thinking about how you think and learn. The key to metacognition is asking yourself *self-reflective questions*, which are powerful because they allow us to take inventory of where we currently are (thinking about what we already know), how we learn (what is working and what is not), and where we want to be (accurately gauging if we've mastered the material). By using metacognition when you study, you can be strategic about your approach. You will be able to take stock of what you already know, what you need to work on, and how best to approach learning new material.

## Use your syllabus and other content as a roadmap

Look at your syllabus. Your professor probably included a course schedule, reading list, learning objectives or something similar to give you a sense of how the course is structured. Use this as your roadmap for the course. For example, for a reading-based course, think about why your professor might have assigned the readings in this particular order. How do they connect? What are the key themes that you notice? What prior knowledge do you have that could inform your reading of this new material? You can do this at multiple points throughout the semester, as you gain additional knowledge that you can piece together.

## Use prior knowledge

Before you read your textbook or attend a lecture, look at the topic that is covered and ask yourself what you know about it already. What questions do you have? What do you hope to learn? Answering these questions will give context to what you are learning and help you start building a framework for new knowledge. It may also help you engage more deeply with the material.

## Think aloud

Talk through your material. You can talk to your classmates, your friends, a tutor, or even a pet. Just verbalizing your thoughts can help you make more sense of the material and internalize it more deeply. Talking aloud is a great way to test yourself on how well you really know the material. In courses that require problem solving, explaining the steps aloud will ensure you really understand them and expose any gaps in knowledge that you might have. Ask yourself questions about what you are doing and why.

## Ask yourself questions

Asking self-reflective questions is key to metacognition. Take the time to be introspective and honest with yourself about your comprehension. Below are some suggestions for metacognitive questions you can ask yourself.

- Does this answer make sense given the information provided?
- What strategy did I use to solve this problem that was helpful?
- How does this information conflict with my prior understanding?
- How does this information relate to what we learned last week?
- What questions will I ask myself next time I'm working these types of problems?
- What is confusing about this topic?
- What are the relationships between these two concepts?
- What conclusions can I make?

Try brainstorming some of your own questions as well.

## Use writing

Writing can help you organize your thoughts and assess what you know. Just like thinking aloud, writing can help you identify what you do and don't know, and how you are thinking about the concepts that you're learning. Write out what you know and what questions you have about the learning objectives for each topic you are learning.

## Organize your thoughts

Using concept maps or graphic organizers is another great way to visualize material and see the connections between the various concepts you are learning. Creating your concept map from memory is also a great study strategy because it is a form of self-testing.

## Take notes from memory

Many students take notes as they are reading. Often this can turn notetaking into a passive activity, since it can be easy to fall into just copying directly from the book without thinking about the material and putting your notes in your own words. Instead, try reading short sections at a time and pausing periodically to summarize what you read from memory. This technique ensures that you are actively engaging with the material as you are reading and taking notes, and it helps you better gauge how much you're actually remembering from what you read; it also engages your recall, which makes it more likely you'll be able to remember and understand the material when you're done.

## Review your exams

Reviewing an exam that you've recently taken is a great time to use metacognition. Look at what you knew and what you missed. Try using [this handout](#) to analyze your preparation for the exam and track the items you missed, along with the reasons that you missed them. Then take the time to fill in the areas you still have gaps and decide how you might change your preparation next time.

## Take a timeout

When you're learning, it's important to periodically take a time out to make sure you're engaging in metacognitive strategies. We often can get so absorbed in "doing" that we don't always think about the why behind what we are doing. For example, if you are working through a math problem, it's helpful to pause as you go and think about why you are doing each step, and how you knew that it followed from the previous step. Throughout the semester, you should continue to take timeouts before, during or after assignments to see how what you're doing relates to the course as a whole and to the learning objectives that your professor has set.

## Test yourself

You don't want your exam to be the first time you accurately assess how well you know the material. Self-testing should be an integral part of your study sessions so that you have a clear understanding of what you do and don't know. Many of the methods described are about self-testing (e.g., thinking aloud, using writing, taking notes from memory) because they help you discern what you do and don't actually know. Other common methods include practice tests and flash cards—anything that asks you to summon your knowledge and check if it's correct.

## Figure out how you learn

It is important to figure out what learning strategies work best for you. It will probably vary depending on what type of material you are trying to learn (e.g. chemistry vs. history), but it will be helpful to be open to trying new things and paying attention to what is effective for you. If flash cards never help you, stop using them and try something else instead.

## Concept Maps

What are concept maps?

Concept maps are visual representations of information. They can take the form of charts, graphic organizers, tables, flowcharts, Venn Diagrams, timelines, or T-charts. Concept maps are especially useful for students who learn better visually, although they can benefit any type of learner. They are a powerful study strategy because they help you see the big picture—because they start with higher-level concepts, they help you chunk information based on meaningful connections. In other words, knowing the big picture makes details more significant and easier to remember.

Concept maps work very well for classes or content that have visual elements or in times when it is important to see and understand relationships between different things. They can also be used to analyze information and compare and contrast.

Making and using concept maps

Making one is simple. There is no right or wrong way to make a concept map. The one key step is to focus on the ways ideas are linked to each other. For a few ideas on how to get started, take out a sheet of paper and try following the steps below:

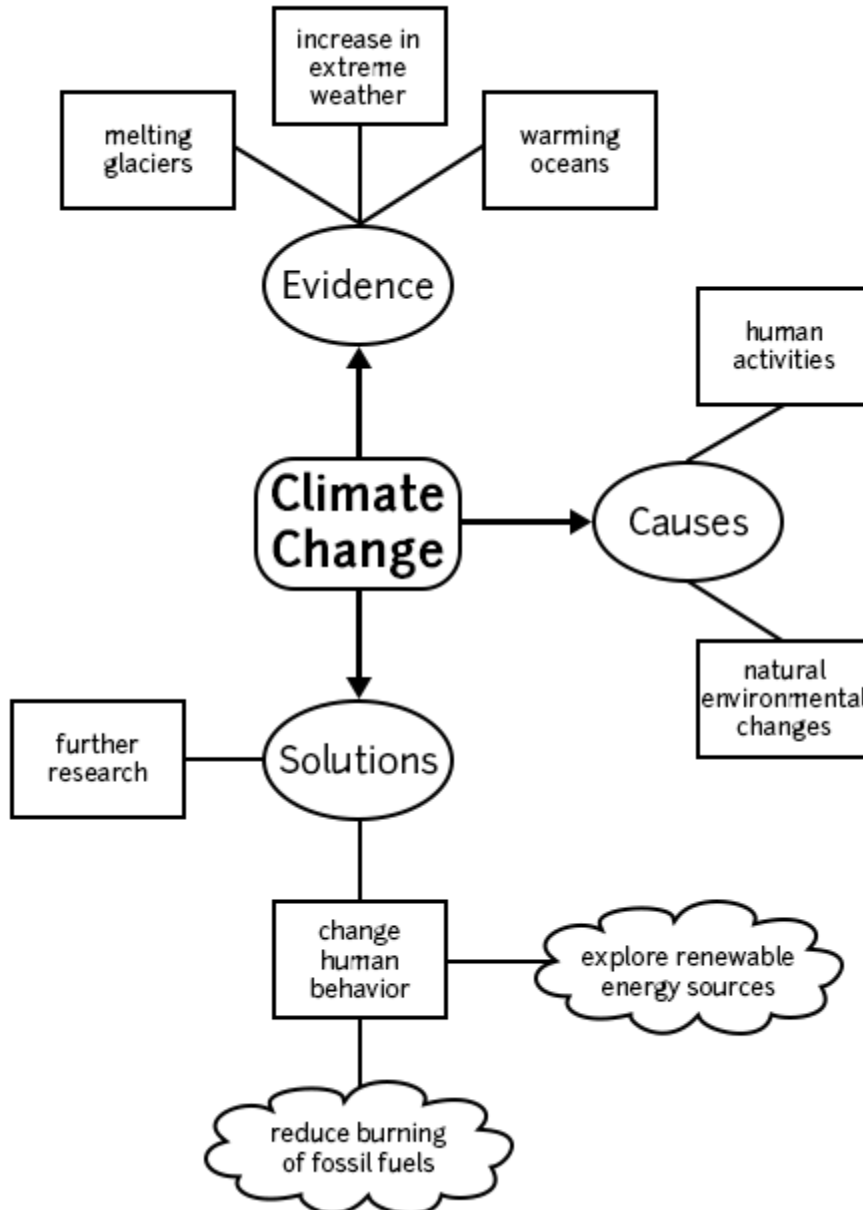
- Identify a concept.
- From memory, try creating a graphic organizer related to this concept. Starting from memory is an excellent way to assess what you already understand and what you need to review.
- Go through lecture notes, readings and any other resources you have to fill in any gaps.
- Focus on how concepts are related to each other.

Your completed concept map is a great study tool. Try the following steps when studying:

- Elaborate (out loud or in writing) each part of the map.
- List related examples, where applicable, for sections of the map.
- Re-create your concept map without looking at the original, talking through each section as you do.

## Examples of concept maps

**Example 4:** This example illustrates the relationship between main idea, such as Climate Change, and supporting details.



**Example 5:** Outlining is a less visual form of concept mapping, but it might be the one you're most familiar with. Outlining by starting with high-level course concepts and then drilling down to fill in details is a great way to determine what you know (and what you don't know) when you're studying. Creating an outline to start your studying will allow you to assess your knowledge base and figure out what gaps you need to fill in. You can use type your outline or create a handwritten, color-coded one as seen in Example 5.

