

EVIDENCE-BASED STUDY STRATEGIES

Table of Contents

<i>Annotated Problems</i>	2
<i>Annotation</i>	5
<i>Bloom’s Taxonomy</i>	7
<i>Boxing Technique</i>	10
<i>Concept Maps</i>	12
<i>Concrete Examples</i>	15
<i>Dual Coding</i>	17
<i>Elaboration</i>	19
<i>Error Log</i>	21
<i>Graphic Organizers</i>	23
<i>Interleaving</i>	26
<i>Mnemonics</i>	28
<i>Pomodoro Technique</i>	31
<i>Practice Tests</i>	33
<i>Retrieval Practice</i>	34
<i>Spaced Practice</i>	36
<i>SQ3R & 3R</i>	38
<i>The Study Cycle</i>	39
<i>References</i>	41
<i>Attribution</i>	48

Annotated Problems

Why Annotate Problems?

Annotated problems help you understand the concepts and procedures behind solving questions. Writing notes while solving helps create a personal study guide for exams and quizzes.

How to Organize Your Annotated Problems

PROBLEM (on top):

Write the problem. Below the problem, set up your workspace with the **solution** and the **explanation**.

SOLUTION (on the left):

Work out the math or problem steps here. Show all your work.

EXPLANATION (on the right):

Explain what you did and why. Note key decisions, formulas, and concepts you applied here.

Choose the layout that works for your space

On a whiteboard or when sketching quickly:

- Use a **T-chart**.
- Draw a vertical line down the middle.
- Label one side **Solution** and the other **Explanation**.

When handwriting in a notebook or on loose paper:

- **Fold your paper in half vertically**.
- Use the left side for your **Solution** and the right side for your **Explanation**.

When working digitally (on a computer, tablet, or online):

- Set up a **2-column table** in a document or notes app.
- Title the left column **Solution** and the right column **Explanation**.

It's not about the tool — it's about keeping your work organized and your thinking clear.

Steps for Annotating a Problem

Step 1: Understand the problem

- What is given? What is asked?

Step 2: Write down the formulas or concepts needed

- (e.g. Power rule, radial acceleration formula, unit conversions)

Step 3: Solve step-by-step with annotations

- Show all the calculations. Explain each step.

Step 4: Final answer with units (if applicable)

- Check if the answer makes sense.

Tactics for Effective Annotation

- Write down why you choose each step or formula.
- Note common pitfalls or tricky parts.
- Summarize what you learned from the problem.

Annotated Problems

Problem (Write your own problem here or use one from your homework.)

Solution	Explanation
<i>(Work out the math or problem steps here)</i>	<i>(Explain what you did and why — note key decisions, formulas, and concepts you applied)</i>

Annotation

What is Annotation?

Annotation means actively interacting with a text by adding your own notes, marks, and questions as you read. It can be:

- A **summary of key points** written directly on the page
- A tool for **close reading** that helps you spot patterns and important ideas
- An **active learning strategy** proven to boost comprehension and retention

Why Annotate?

- Organize and isolate important material
- Identify key concepts and arguments
- Monitor your understanding as you go
- Make studying and exam prep faster and easier
- Often quicker and more useful than writing separate notes

How Do You Annotate?

Summarize Key Points in Your Own Words

- Use **headers, bold terms, and topic sentences** as guides
- Look for main ideas, supporting evidence, and argument structure
- Notice how the author organizes ideas (chronologically? by theme?)

Circle or Highlight Key Words and Phrases

- Mark unfamiliar terms to look up later
- Pay attention to recurring terms from class or lectures
- Compare different terms for similar ideas

Add Comments, Questions, and Symbols in the Margins

- Write quick thoughts, reactions, or clarifying notes
- Ask yourself: *“What’s important here? How does this connect to what I already know?”*

Tactics

Try separating reading and annotating. First, read a section quickly, then go back and annotate.

Try These Symbols:

Symbol	Meaning
?	• I have a question / need to explore
!	• Interesting / surprising / makes a connection
*	• Good example / possible exam material

Create your own system too — whatever makes sense to you!

Highlight or Underline — But Be Smart About It

- Highlight selectively. Aim for **no more than 25-30%** of a page
- Focus on **main ideas, key terms, and definitions**
- Use digital tools like PDF editors, e-book apps, and browser extensions

Helpful Tools for Digital Annotation

- **PDF readers:** Use highlight, comment, and note functions
- **Online textbooks:** Check for built-in annotation features
- Apps like **OneNote, Evernote, and Google Keep** let you import readings and annotate
- **Browser add-ons:** Tools like **Hypothesis** or **Diigo** let you annotate web pages

What Are the Big Takeaways?

- Annotation is a tool to **engage deeply** with what you're reading
- The more you process and interact with the material, the better you'll understand and remember it.
- Ask yourself as you annotate: *"How would I explain this to a friend?"*

Common Concern: "It Takes Too Long!"

Yes — but it's time invested, not wasted.

Benefits of annotating

- Saves time later when studying
- Improves long-term understanding and recall
- Helps you build the knowledge base for your major and future career

Bloom's Taxonomy

Why Study Strategies May Need an Upgrade in College

Many students enter college using the same study strategies they used in high school — strategies focused mostly on memorizing and understanding content. But college coursework demands deeper thinking. Professors often design assignments and exams that ask you to apply, analyze, evaluate, and create, not just recall facts.

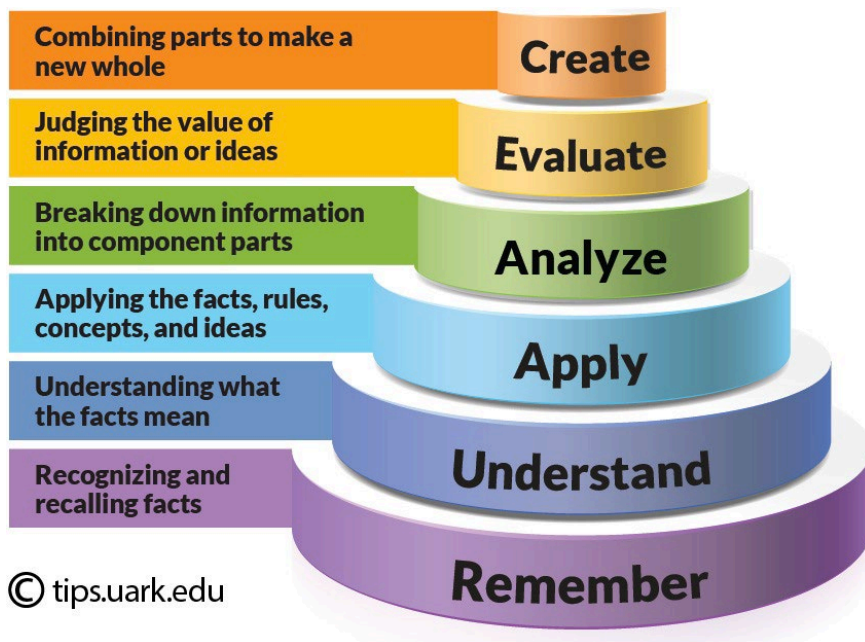


Figure 1: Bloom's Taxonomy visual model. Image by Jessica Shabatura, from *Tips for Teaching with Bloom's Taxonomy*, University of Arkansas. Available at: <https://tips.uark.edu/using-blooms-taxonomy/>

This handout introduces **Bloom's Taxonomy**, a framework that can help you strengthen your study habits and match the kind of thinking college demands.

Using Bloom's Taxonomy helps you:

- Make your study sessions more meaningful
- Improve long-term retention
- Anticipate the types of questions your professors will ask

The Levels of Bloom's Taxonomy

Use the study methods and question types below to guide your preparation.

Level 1: Remember

Goal: Recall factual information like names, dates, formulas, and definitions.

Study Methods:

- Make and review flashcards.
- Create lists or timelines.
- List main characteristics or components.

Questions to Ask Yourself:

- How would you define...?
- List the _____ in order.
- Who were...?

Level 2: Understand

Goal: Explain ideas and concepts; make meaning by interpreting or summarizing.

Study Methods:

- Discuss content with a partner.
- Explain main ideas aloud.
- Write chapter summaries in your own words.

Questions to Ask Yourself:

- How would you differentiate between _____ and _____?
- What is the main idea of _____?
- Why did...?

Level 3: Apply

Goal: Use information in real-world situations or new contexts.

Study Methods:

- Find concrete examples for abstract ideas.
- Work through practice problems.
- Write instructional materials or guides.

Questions to Ask Yourself:

- Why does _____ work?
- How would you change _____?
- How would you develop a set of instructions about...?

Level 4: Analyze

Goal: Break down information into parts and examine relationships.

Study Methods:

- List contributing factors to a problem.
- Evaluate the importance of different elements.
- Consider different viewpoints.

Questions to Ask Yourself:

- How does this element contribute to the whole?
- What is the significance of this section?
- How would _____ group see this?

Level 5: Evaluate

Goal: Make judgments about ideas or arguments based on criteria and reasoning.

Study Methods:

- Decide whether you agree or disagree with authors or arguments.
- Consider how you would improve a theory or approach.
- Compare the strengths of different perspectives.

Questions to Ask Yourself:

- What is your opinion about _____? What evidence supports it?
- How would you improve this?
- Which argument or approach is stronger? Why?

Level 6: Create

Goal: Put elements together to form a new, original product or idea.

Study Methods:

- Build a model or diagram.
- Design an experiment.
- Write a story or poem explaining a concept.

Questions to Ask Yourself:

- How can you create a model to teach this concept?
- What experiment could test this idea?
- How could this information be told as a story or poem?

Boxing Technique

What Is It?

The Boxing Technique is a simple, effective method you can use with your existing class notes, PowerPoint slides, or study guides to improve how you actively recall information.

Why Use It?

Most students rely on passive strategies like re-reading, highlighting, or cramming. These don't build strong, lasting knowledge. Active recall (retrieving information from memory) strengthens learning — and The Boxing Technique makes it easy to do while tracking what you know and what you don't.

How To Do It

Open Your Study Materials

- Use a Word document, PowerPoint, or digital notes.

Review and Identify Key Info

- Read through a slide or page carefully.
- Summarize important ideas and identify key facts or concepts you'll need to remember.

Cover Info with a Box

- Draw a blue box over the important information.
- The blue color means you haven't tested yourself on this material yet.

Write a Retrieval Cue

- Add a question or prompt on the box that will help you recall the information underneath.
- Good retrieval cues might ask you to:
 - Recall a fact.
 - Explain a concept.
 - Apply an idea to a scenario.
 - Give an example.
 - Compare or analyze ideas.

Test Yourself

- Without peeking, answer the retrieval cue out loud or in writing.

Check Your Answer

- Move the blue box aside and compare your answer to the information underneath.
- Pay attention to how complete and accurate your response is.

Color Code Your Box

- Change the color of the box based on how well you did:
 - Green = Got it right.
 - Yellow = Partially right.
 - Red = Incorrect or incomplete.

Why It Works

- Tracks your learning: You'll clearly see what you've mastered and what needs work.
- Prevents overconfidence: Don't guess how prepared you are. Rely on your color-coded data.
- Reduces exam anxiety: The visual progress helps you plan smarter and worry less.
- Promotes deeper learning: Crafting good retrieval cues and attempting recall improves understanding and memory.

Pro Tactics

- Space out your retrieval practice sessions. Avoid testing yourself immediately after reviewing the material.
- Don't spend too much time making flashcards — use this method directly on your notes/slides.
- In PowerPoint, use **Slide Sorter View** to get a quick overview of your colored boxes.

Bonus: Mix in Other Study Strategies

When writing retrieval cues, you can:

- Ask for examples (concrete examples help memory).
- Link concepts together (elaboration).
- Pair visuals with explanations (dual coding).

Ready to try it? Grab your slides or notes, open a doc, and start boxing!

Concept Maps

A Simple Way to Organize Ideas and See How They Connect

What's a Concept Map?

A **concept map** is a visual diagram that shows how ideas, events, or concepts connect to each other. It helps you:

- See the big picture of a topic
- Track cause-and-effect relationships
- Spot patterns and themes
- Organize ideas before writing a paper or preparing for a test

Why Use a Concept Map?

Concept maps can help you:

- **Break down complex topics** into clear, connected parts
- **Visualize relationships** between causes, effects, and key ideas
- **Organize your thinking** in a way that's less intimidating than outlines
- **Boost participation** in group discussions and projects
- **Uncover new insights** you might miss with linear notes

How to Make One

You can create a concept map on paper, a whiteboard, or digitally (using apps like Lucidchart, Canva, or even Google Docs drawings).

Steps:

1. **Gather your materials:**

- Index cards or sticky notes (for key ideas, events, or quotes)
 - Markers or pens
 - Paper or a table/board to work on
2. **Write down important ideas or events:**
- Example: For the French Revolution, you might include “Storming of the Bastille,” “Robespierre on Terror,” or “Declaration of the Rights of Man.”
3. **Place them in rough order:**
- Chronological, thematic, or from cause to effect
4. **Draw arrows or lines to show connections:**
- Show how ideas/events relate, influence, or contrast with each other
5. **Add labels and categories:**
- Group related ideas (like “Economic Causes” or “Cultural Shifts”)
6. **Review and refine your map:**
- Discuss with classmates or reflect on what stands out
 - Add missing connections or insights

When to Use Concept Maps

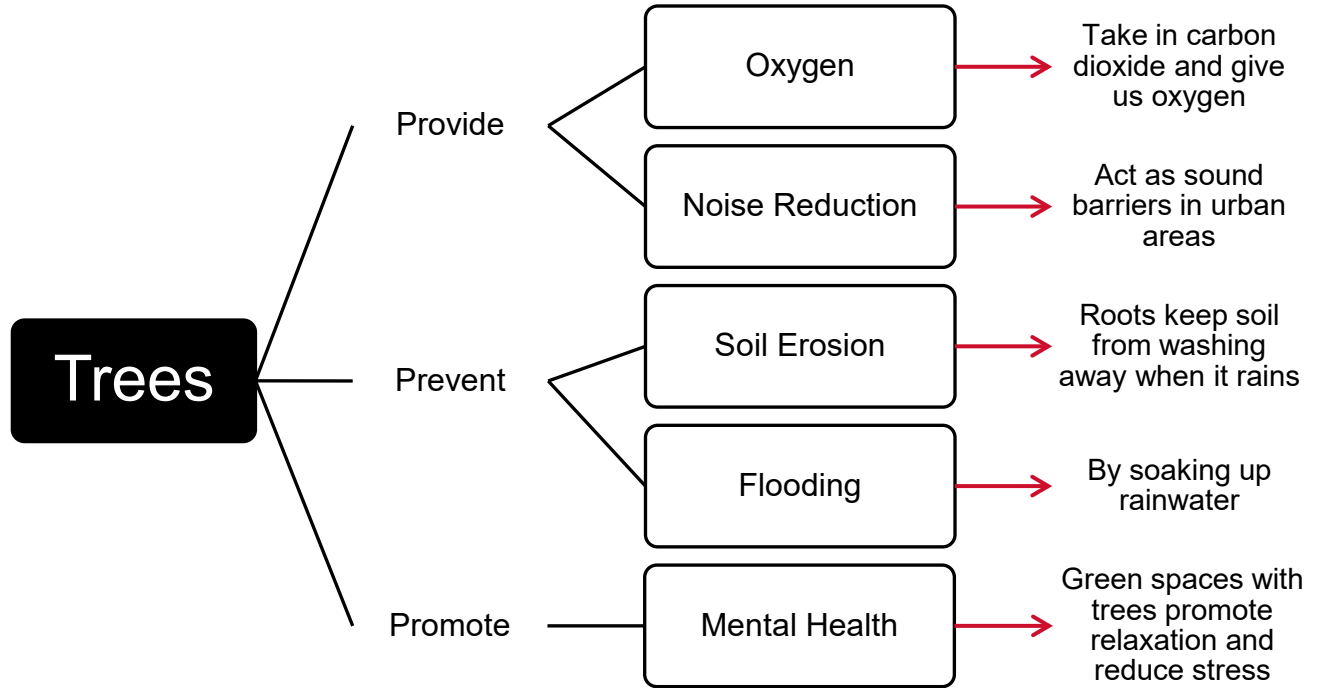
- **During group discussions** to track ideas
- **When studying** for a big exam
- **To brainstorm for papers or projects**
- **To review a topic** and see how everything fits together

Tactics:

Concept maps aren’t just for history class. Use them for science processes, literature themes, social movements, or even personal goal planning!

Example: Trees concept map

Relationships between concepts and connections are highlighted. You can add images, too.



Key Takeaway:

Concept maps help you **see, connect, and organize** ideas in a clear, creative way, making complex topics easier to tackle.

Concrete Examples

Why Use Concrete Examples?

Some ideas are hard to understand because they're abstract — meaning they don't have a clear, physical form you can picture. But your brain loves specifics! When you tie a tough idea to a clear, real-world example, you're more likely to remember and truly get it.

Example

Abstract Idea: Scarcity — The rarer something is, the higher its value.

Concrete Example: Airline ticket prices go up as fewer seats remain before a flight.

When Should You Use Concrete Examples?

- When a definition or concept feels vague or confusing
- When studying vocabulary or theories in science, economics, psychology, etc.
- When preparing for a test and trying to explain ideas in your own words

Where to Find Good Examples

- In your class notes, textbooks, or study guides
- From examples your teacher shares in class
- From your own life experiences
- By brainstorming with a classmate or academic coach
- Online (Use Google Images to find pictures illustrating concepts like **scarcity** or **shrinkflation**.)

Quick Practice: Make It Concrete!

Pick one abstract idea you're learning right now and come up with a real-world example.

Abstract Idea: _____

Concrete Example: _____

Check: Is your example accurate and clear? If unsure, ask your classmate or professor!

Try to come up with more than one example per concept. Seeing it from different angles helps it stick!

Tactics for Using Concrete Examples While Studying

- Add examples next to definitions in your notes

- Quiz yourself: “Can I explain this with a real-world example?”
- Share examples out loud when studying with others

Dual Coding

What is dual coding?

Dual coding is when you study by combining **words and visuals**.

Examples of visuals:

- Diagrams
- Timelines
- Infographics
- Comic strips
- Graphic organizers

Having the same info in **two formats** gives you **two ways to remember it later**.

How to Practice Dual Coding

Step 1: When reading your class notes or textbook, find visuals (charts, diagrams, images) that go with what you're reading.

Step 2: Compare the words to the visuals. Ask:

- How do the words describe what's in the picture?
- How does the picture explain what's in the words?

Step 3: Look only at the visuals and explain them in your own words.

Step 4: Now, **create your own visuals** for your notes!

Example: Draw a simple diagram for a science process or a timeline for a history chapter.

Dual Coding + Retrieval = Lasting Learning

Once you've made your dual-coded notes:

- Cover your class materials.
- Try to **write out what you remember** and **recreate the visuals** from memory.
- Then, check your work.

Dual coding + retrieval practice = stronger, long-lasting learning.

Is this the same as learning styles?

Good question — **nope!** Research shows matching study methods to a so-called “learning style” doesn’t improve learning.

What works? Combining **words + visuals** helps **everyone** learn better, no matter what your preferences are.

Quick Practice: Try it out!

Pick one concept from your class this week.

- **Draw a simple visual** (diagram, timeline, or chart) to explain it.
- Then, **write 2-3 sentences in your own words** describing what’s happening in the visual.

How did creating a visual help you understand the concept better?

Tactics

Don’t stress about being artistic. Stick figures and scribbles work fine as long as *you* understand them!

Elaboration

What is Elaboration?

Elaboration is a study method where you **explain and describe ideas in detail**, make connections between new material and what you already know, and relate class concepts to real-life experiences.

What is Elaborative Interrogation?

Elaborative Interrogation is a specific type of elaboration where you ask yourself “**how**” and “**why**” questions about the material you’re learning.

Example Questions

- *How does this work?*
- *Why does this happen?*
- *What causes this?*
- *What is the result?*

How to Use Elaborative Interrogation

Step 1: Make a list of key ideas you need to learn.

Step 2: Go down your list and ask yourself **how and why questions** about each idea.

Step 3: Use your textbook, notes, and materials to answer these questions.

Step 4: Make connections between ideas:

- How are two ideas similar?
- How are they different?

Step 5: Relate concepts to your own life, experiences, and day-to-day situations.

Step 6: Gradually practice explaining ideas **without looking at your notes** (this is called **retrieval practice** — a bonus memory booster!).

What Happens When You Use This Strategy?

- You create **explanations for ideas**, making them easier to remember.
- You link new information to things you already know.
- You strengthen understanding by comparing and contrasting ideas.
- You improve your ability to **recall and apply material on exams and in real-life situations**.

Example Questions by Subject

Math:

- How do derivatives work?
- Why does the interval approaching zero give us the instantaneous rate of change?

Science (Neuroscience):

- How does a neuron send messages?
- Why is the myelin sheath important?
- How are axons and terminal buttons similar and different?

History:

- How did the attack on Pearl Harbor happen?
- Why did Japan attack the U.S.?
- What were the results of this event?
- Why is this event historically important?

Tactics

- After you study, **double-check your answers** with class materials.
- Keep practicing over time (this is called **spacing**) to strengthen memory.
- Teach a friend or classmate what you've learned. Let them ask you "how" and "why" questions!

Error Log

Mistakes aren't setbacks — they're opportunities to learn. One of the smartest ways to improve in any subject is to track your errors, understand them, and avoid making the same mistake twice. That's where an **Error Log** comes in.

What Is an Error Log?

An **Error Log** is a simple, organized record where you keep track of the mistakes you make on assignments, quizzes, practice problems, and exams. It helps you spot patterns, target weak areas, and improve your accuracy over time.

Why Use an Error Log?

- Turn mistakes into lessons
- Spot patterns in your errors
- Target weak areas for review
- Build confidence by tracking progress
- Boost test performance

How to Set One Up

You can use a notebook, spreadsheet, or notes app — whatever works best for you.

Each entry should include:

Date	Assignment/Quiz	Question/Problem Number	Type of Error	Correct Answer	Lesson Learned
6/5/25	Chem Homework 3	Q5	Misread the question	7.0 mL	Slow down and underline key numbers

Date	Assignment/Quiz	Question/Problem Number	Type of Error	Correct Answer	Lesson Learned
6/5/25	Bio Quiz 2	Q8	Forgot a formula	C ₆ H ₁₂ O ₆	Review photosynthesis equation

Common Error Types to Track

- Misreading the question
- Forgetting a formula
- Simple calculation error
- Concept misunderstanding
- Skipping a step
- Poor time management
- Careless mistake

How to Use It Effectively

1. Log errors immediately after reviewing assignments, quizzes, or tests.
2. Identify trends: Are you missing similar types of questions?
3. Review before exams: Focus on recurring mistakes.
4. Practice correcting those mistakes using similar problems.
5. Update your study plan based on what you find.

Tactics: Track Small Wins Too

Note when you finally stop making a repeated mistake — it'll remind you that you're making progress and help build confidence.

Final Thought

An error log turns every mistake into a resource for improvement. Instead of moving past errors quickly, pause, reflect, and learn — your future self (and your GPA) will thank you.

Graphic Organizers

What Are Graphic Organizers?

Graphic organizers are **visual tools that organize and connect ideas**. They can look like:

- Charts
- Graphic organizers
- Outlines
- Flowcharts
- Venn diagrams
- Timelines
- T-Charts

They help you **see the big picture**, group related information together, and make studying easier.

Why Use Graphic Organizers?

- Organize complex information clearly
- Spot connections between ideas
- Understand how concepts fit into a bigger framework
- Remember details better because you understand how they're connected

They're perfect for:

- Classes with visual or process-based content
- Comparing and contrasting ideas
- Reviewing steps in a process
- Summarizing key topics

How to Make a Graphic Organizer

There's no "right" way — but here's a simple process to get started:

- **Pick a concept.**
- **From memory**, sketch out a map of related ideas.
- Check your notes, books, or lectures to fill in missing information.
- Focus on **how ideas connect** to each other.
- Use lines, arrows, colors, or shapes to show relationships if helpful.

How to Use Your Graphic Organizer to Study

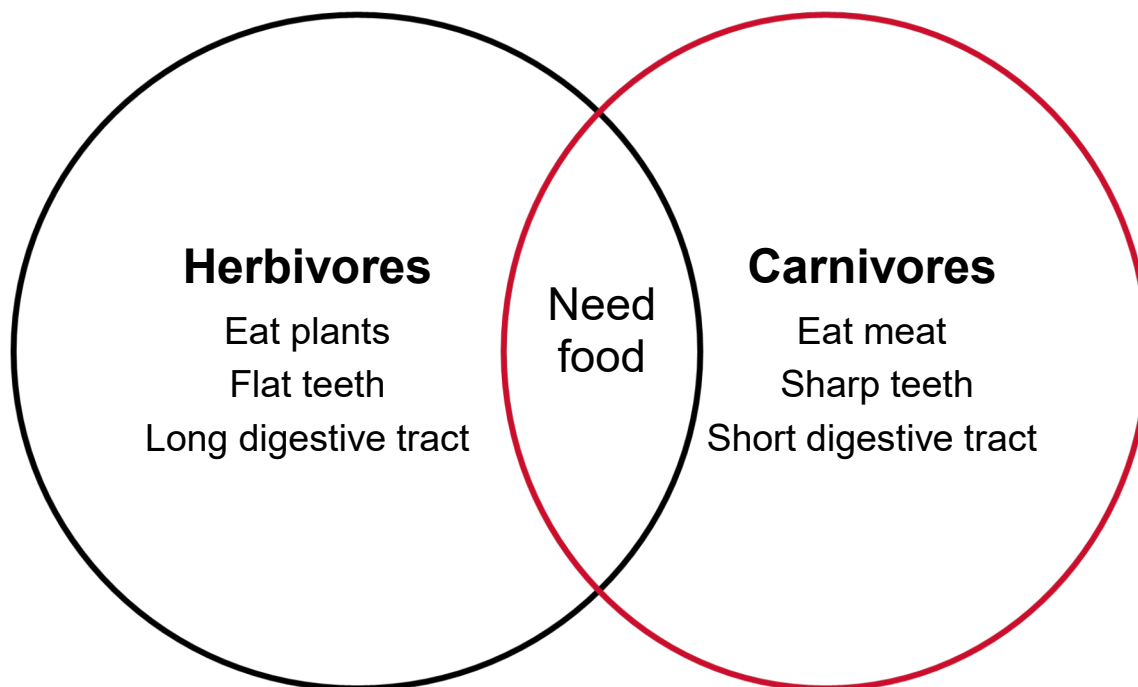
- Explain each part out loud or in writing.
- Add examples for each section.
- Re-create the map without looking, and talk yourself through each section.

Examples of Graphic Organizers

Example 1: Venn Diagram

Compares similarities and differences.

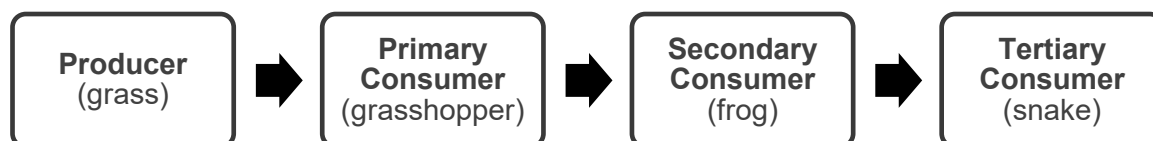
Example: Herbivores vs. Carnivores



Example 2: Process Diagram

Shows steps in a process.

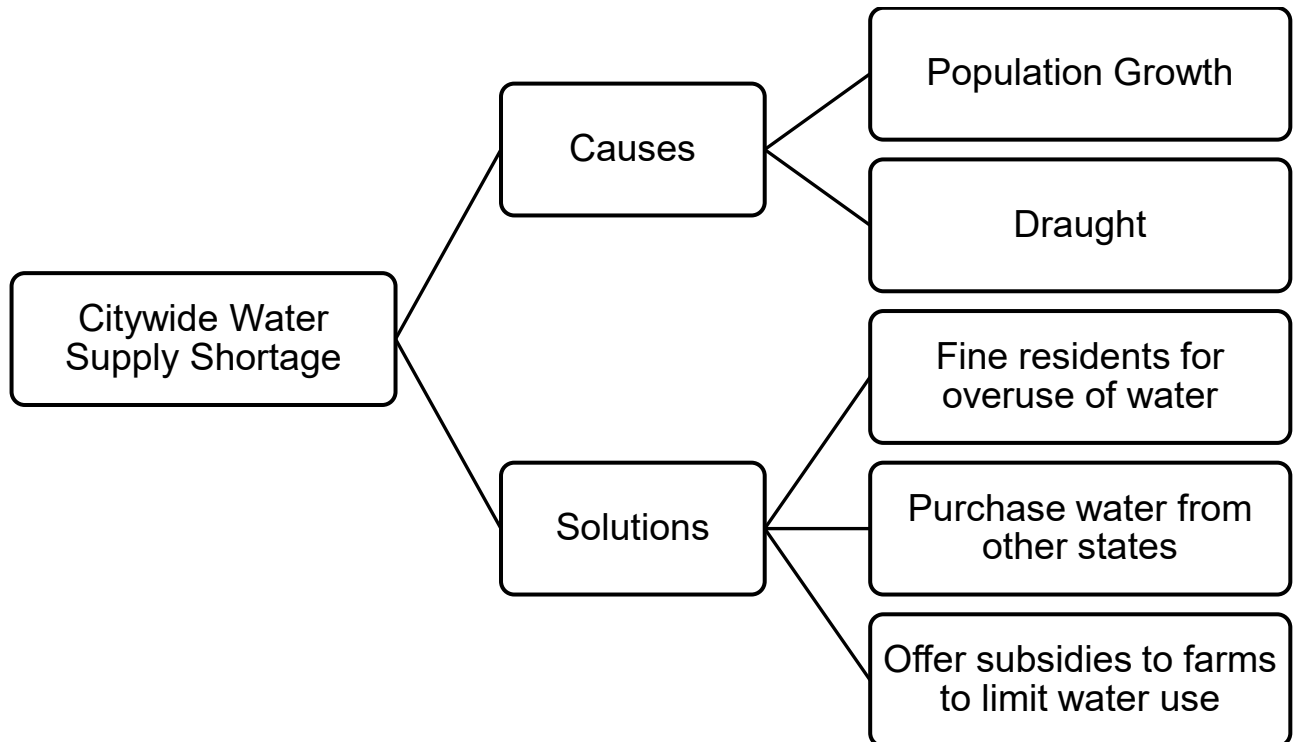
Example: Food Chain



Example 3: Problem and Solution Map

Shows causes of a problem and possible solutions.

Example: Problem—Citywide Water Supply Shortage



Tactics

Graphic organizers aren't about being perfect — they're about **making connections you understand**. Use them to turn complicated information into clear, memorable study tools.

Interleaving

What is interleaving?

Interleaving is a study strategy where you **switch between ideas, topics, or types of problems while studying**, instead of focusing on one idea for a long time.

It might feel a little harder than studying one topic at a time — but research shows it can actually improve your learning in the long run.

Why use interleaving?

Interleaving helps you:

- Pick the right method or strategy for different types of problems
- Notice similarities and differences between concepts
- Strengthen your problem-solving and critical-thinking skills

Examples

Instead of practicing 5 similar math problems in a row, mix them up with different problem types or topics in between.

When should you use interleaving?

- When reviewing problem-solving subjects like math, physics, or chemistry
- When preparing for cumulative exams covering multiple topics
- When you need to compare and contrast similar ideas

How often should you switch topics?

It's important to find the right balance:

- **Don't study one thing for too long** — you might get too comfortable and stop thinking critically
- **Don't switch too quickly** — or it turns into multitasking, which isn't effective

Study a chunk of material first (maybe 15-20 minutes)

- Then switch to a new topic or problem type
- Come back to earlier topics later to reinforce your learning

How to interleave effectively?

- When reviewing problem-solving subjects like math, physics, or chemistry
- When preparing for cumulative exams covering multiple topics
- When you need to compare and contrast similar ideas

Quick Practice: Try it out!

Pick three topics you need to study for your next exam.

Topics I'll Study:

1.

2.

3.

Plan to rotate between them during a one-hour study session.

How long will I spend on each before switching? _____ minutes

Tactics

Don't just switch topics and reread your notes. Instead, actively quiz yourself, explain ideas in your own words, or make connections between topics **as you go**.

Mnemonics

What is a Mnemonic Device?

A **mnemonic device** is any memory aid that helps you **encode, store, or retrieve information** by adding structure, cues, or creative associations. It turns hard-to-remember facts into something more memorable.

What Are Imagery-Based Mnemonics?

Imagery-Based Mnemonics are a type of mnemonic device that uses **vivid mental images, spatial layouts, or visual stories** to help you remember information. Instead of depending on words alone, these techniques turn facts and lists into memorable pictures or scenes in your mind.

Use these four evidence-based techniques to create strong, lasting memory cues that h make recall easier:

1. Imagery

Create a vivid, exaggerated mental picture for each fact or concept.

Example:

To remember that *mitochondria* is the powerhouse of the cell, picture a tiny power plant inside a cell cranking out energy bolts.

When to use it: Definitions, facts, names, or terms that don't naturally stick.

2. The Link Method (Story Chain)

Connect items in a list by making a mental story that links one item to the next with images.

Example:

To remember *apple, book, dog, hat*:

Imagine a giant **apple** reading a **book** to a **dog** wearing a **hat**.

When to use it: Lists, processes, or steps you need to remember in order.

3. Peg System

Use a pre-memorized list of “pegs” (like numbers linked to objects) and associate each fact with a peg using mental images.

Classic Number Peg Example:

- 1 → bun
- 2 → shoe
- 3 → tree
- 4 → door
- 5 → hive

To remember 1) heart, 2) lungs, 3) brain:

Visualize a **heart in a bun**, **lungs in a shoe**, and a **brain in a tree**.

When to use it: Numbered lists, rankings, or ordered facts.

4. Method of Loci (Memory Palace)

Visualize a familiar place (like your dorm or house) and mentally place each item you want to remember at specific locations.

Example:

To memorize the first four U.S. presidents:

- Picture **Washington** standing at your front door.
- **Adams** sitting on your couch.
- **Jefferson** in your kitchen.
- **Madison** in your bedroom.

Walk through the space in your mind when you need to recall them.

When to use it: Longer lists, speeches, presentations, or chronological events.

Quick Tactics for Using Mnemonics Effectively

- Make images exaggerated, weird, or funny — unusual images are easier to recall.
- Engage multiple senses: imagine sounds, colors, and textures.
- Practice recalling the information both forwards and backwards.
- Combine techniques (like imagery within a Memory Palace) for complex material.

These techniques turn boring lists into mental movies — and your brain remembers movies better than plain facts!

Try It Now!

Pick a concept from your class today. Which mnemonic technique can you use to make it stick?

- Imagery
- Link Method
- Peg System
- Method of Loci

Pomodoro Technique

The Pomodoro Technique is a simple time management strategy that breaks work into focused, timed intervals called *Pomodoros*, with short breaks in between. It helps students stay productive, avoid burnout, and manage large tasks by tackling them in manageable chunks.

How It Works

1. **Choose one specific task** to work on.
2. **Set a timer for 25 minutes** (use your phone, a kitchen timer, or a timer app).
3. **Work on that one task only** until the timer rings.
4. **Take a 5-minute break** to stretch, hydrate, or relax.
5. **Repeat this process 4 times.**
6. After 4 Pomodoros, **take a longer 15–30 minute break.**

Why It Works

- Encourages focused work without multitasking
- Makes large projects feel more manageable
- Builds in regular breaks to prevent mental fatigue
- Helps track progress and time spent on tasks
- Increases awareness of how long tasks actually take

Example of a Pomodoro Plan

Time Block: Task

1 Pomodoro: Draft topic sentences for essay

1 Pomodoro: Revise introduction paragraph

1 Pomodoro: Complete math homework problems 1–5

1 Pomodoro: Review lecture notes

Tactics for Success

- Break down big, vague tasks like “study” into clear, specific actions (e.g., “complete flashcards for Chapters 3–4”).
- Adjust the length of the Pomodoros if needed. Some students prefer **50-minute focus sessions with 10-minute breaks**.
- Tackle difficult or high-focus tasks earlier in the day.
- Use breaks wisely: stretch, step outside, grab a snack, or move around.
- Avoid screens during breaks to truly recharge.

Make the Method Work for You

Adjust the length of the Pomodoros if needed. Some students prefer **50-minute focus sessions with 10-minute breaks**.

Quick Pomodoro Summary

- Pick a task
- Set a 25-minute timer
- Focus only on that task
- Take a 5-minute break
- Repeat 4 times
- Take a 15–30 minute break

Practice Tests

How you use your practice tests matters just as much as how many you do.

What's the Best Way to Use Practice Tests?

A recent study looked at two ways students could use retrieval practice:

- **Student-Controlled:** You decide when to drop a question after getting it right.
- **Experimenter-Controlled:** You keep answering the same question until you get it right five times before dropping it.

Not surprisingly, most students dropped a question after one correct answer. It feels efficient — but is it the best move?

What Did the Research Find?

- **Repeated retrieval improves long-term memory.**
Students who answered a question correctly five times remembered more later.
- **Multiple choice and short answer questions worked about the same** for remembering material — but multiple choice took less time.
- **Students who controlled their own practice made faster gains per minute spent studying.**

On average, they gained 17% per minute compared to 7% per minute for those who kept going until five correct answers.

Time vs. Retention — Finding the Sweet Spot

- **If you're short on time:**
Don't skip retrieval practice. Aim to answer everything correctly at least once.
- **If you have extra time or high-stakes material:**
Repeating questions you got right a few more times can help lock it in.
- **Multiple choice is an efficient choice** when you're managing time — especially if your real exam is multiple choice.

Key Takeaways

- Retrieval practice works. Don't skip it.
- One correct attempt is better than none when time is tight.

- More correct attempts mean better retention, but it takes more time.
- Multiple choice self-tests are efficient, especially for quick review.

Retrieval Practice

What is Retrieval Practice?

Retrieval practice means **bringing information to mind from memory** — without looking at your notes or textbook — after you’ve learned it. The key is to wait until you’ve started to forget a little, so your brain has to work to remember it. The effort makes your memory stronger!

What happens when you use retrieval practice?

When you practice retrieving, you’re not just checking what you remember — you’re actually **strengthening your ability to remember it later** and **use it in different situations**.

Compared to just reviewing your notes or textbook, retrieval practice makes learning stick longer.

How can you practice retrieval?

Try one of these methods:

- **Practice Questions:** Use practice quizzes or questions at the end of textbook chapters — but don’t peek at your notes!
- **Write It Out:** On a blank sheet, jot down everything you remember about a topic.
- **Sketch It:** Draw a diagram or picture that explains the idea — from memory.
- **Flashcards:** Quiz yourself using flashcards or an app — try to recall the answer before you flip the card.
- **Concept Maps:** Make a web linking related ideas together, showing how concepts connect. Do it from memory first.

What should you do after retrieval practice?

After you finish recalling from memory:

- **Check your notes** or textbook.
- **Correct mistakes** or fill in anything you missed.

- **Repeat the retrieval a little later** — spacing it out makes your memory even stronger!

Quick Practice

Pick one topic from class this week.

Without looking at your notes:

- Write down or sketch everything you remember.
- Then check your notes — what did you miss?
- What surprised you about what you did or didn't remember?

How did it feel to retrieve from memory without looking?

If It Feels Tough, You're Doing It Right

It's normal for this to feel tough — that means it's working!

Spaced Practice

What is spaced practice?

Spaced practice means spreading your study sessions out over time instead of cramming it all in right before an exam. **Same total study time — but better results.**

Example

5 hours of studying spread over 2 weeks instead of 5 hours crammed the night before

Why should you space your learning?

- You remember more long-term
- You spend less time relearning material later
- You avoid stressful all-nighters
- You actually learn instead of just memorizing

How to start using spaced practice

- **Plan early** — as soon as the semester starts
- **Schedule short study sessions** on different days
- **Review older material too**, not just your most recent notes
- Don't just re-read — use effective strategies like:
 - **Retrieval Practice:** Test yourself from memory
 - **Elaboration:** Explain concepts in your own words

Tactics

Forget a little — then remember.

It's normal (and good) to forget some material between study sessions. This makes your brain work harder when you review it later, which strengthens your memory!

“But...Cramming Works for Me!”

Sure — for short-term recall. But:

- It actually takes more total time
- You'll forget it quickly

- It kills your sleep (and sleep = memory fuel)

Spaced practice saves you time and boosts your grades. Your future self will thank you.

Quick Practice for Spaced Studying

3 Question Recap

At the end of your study session, answer:

- What's the most important thing I learned today?
- What's one thing I'm still a little fuzzy on?
- How does today's topic connect to something I've learned before?

Mix & Match Review

Before starting today's topic, spend **3 minutes reviewing a topic from last week.**

Write down 2 facts or one problem you remember without looking.

Write It Without Notes

Close your notebook and list everything you can remember about the topic you just studied.

Then, check your notes to see what you missed.

Teach It to an Imaginary Student

Pretend you're explaining the concept to a classmate who missed class.

Use plain language and one example. This forces you to retrieve and process the material actively.

Tiny Quiz

Create 3 quick quiz questions from today's topic. Answer them tomorrow or later in the week.

SQ3R & 3R

What is SQ3R?

A classic five-step reading strategy to help you better understand and remember what you read:

Survey: Skim headings, subheadings, pictures, and summaries to get the big idea.

Question: Turn headings into questions you'll answer while reading.

Read: Read actively, looking for answers to your questions.

Recite: After each section, pause and explain what you just read in your own words — out loud or in writing.

Review: Go back later, check your answers, and review key points.

Does It Work?

Research shows mixed results because people don't always use it the same way.

Good News: A simpler version called **3R (Read–Recite–Review)** works really well:

- **Read** a section
- **Recite** it from memory
- **Review** it by re-reading

In studies, students using 3R remembered more and finished faster than those who just took notes or re-read the material.

Quick Tactics for Success:

- If you like SQ3R, make sure your questions are meaningful and that you recite from memory.
- Or skip the extra steps and stick with **3R** — it's easy to learn, fast to use, and proven to help you remember more.

Bottom line: Don't just read — *actively work with what you read*. That's how you'll learn it better.

The Study Cycle

Do you have trouble building study time into your schedule? Do you find yourself waiting until the last minute to study for exams? The Study Cycle, adapted from Frank Christ's PLRS system by the LSU Center for Academic Success and discussed by Sandra McGuire in *Teach Yourself How to Learn*, is a simple guide to help you build effective studying into your everyday routine.

On the surface, each step may seem obvious — but too often, students skip steps and miss valuable opportunities. Each part of the Study Cycle builds on the last and spreads your learning throughout the semester, making it much more effective than last-minute cramming.

Step 1: Preview

Before you go to class, quickly look over the material that will be covered. This gives you a sense of the big picture and helps you notice how ideas fit together.

- Skim headings, introductions, and summaries.
- Check the syllabus or course schedule to know what's coming up.
- If available, look at PowerPoint slides or learning objectives before class.
- Even a quick preview makes a difference — combining reading, skimming, and attending class improves learning far more than doing any one of these alone.

Step 2: Attend Class

Showing up matters — but being engaged matters more.

- Listen actively and stay present.
- Take useful notes in your own words.
- Avoid distractions from phones or unrelated web browsing.
- Ask questions and participate when possible.
- Pay attention to what the professor emphasizes — it's often a hint about what will appear on exams.

Step 3: Review

After class, review your notes while the material is still fresh.

- Fill in any gaps and clarify confusing points.
- Summarize key concepts in your own words.

- Identify questions you still have.
- Plan how you'll study this material later.

This step should happen as soon as possible after class — even a 10-minute review helps solidify your learning.

Step 4: Study

Set up several short, focused study sessions for each class throughout the week.

- Aim for 20–30 minute sessions (adjust as needed for the material).
- Break up long study times into smaller, productive sessions with breaks in between.
- Set specific goals for each session (e.g., “I will quiz myself on Chapter 3 concepts”).
- Use active learning techniques:
 - Solve problems
 - Make concept maps
 - Teach the material out loud
 - Test yourself without notes

Distributed practice (studying a little over time) is much more effective than cramming.

Step 5: Check

Regularly reflect on what's working and what isn't.

- Ask yourself, “*How well do I understand this?*”
- Test yourself on concepts without looking at your notes.
- Talk about what you're learning with a classmate or tutor.
- Check in with your course objectives: Are you meeting them?

If your current strategies aren't helping, be willing to adjust. Effective learners stay flexible and reflective.

Remember:

Learning is a process, and the Study Cycle helps keep you engaged with your courses consistently throughout the semester — not just the night before an exam.

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