

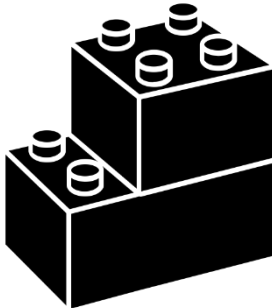
# Exercises for training session three: Practice

## Contents

Elaboration .....	2
Summarizing using the Cornell method .....	3
Practice testing.....	5
The dual-coding method using visualizations .....	6
Planning how to apply distributed practice and interleaved practice .....	7

## Elaboration

### THE STRATEGY IN SHORT



The focus of this strategy is connecting new information to information you already knew, for example to explain new concepts or relate concepts to each other.

Students explaining concepts to each other also naturally use elaboration (within the PBL groups or studying with friends). This strategy is especially useful when you are learning factual information—particularly if you already know something about the subject.

### HOW TO DO IT:

While reading, challenge your inner ‘inquisitive child’ (or baby brother/sister, niece, nephew; any child around the age of 4). The easiest question to ask yourself while reading materials is ‘Why?’:

- “Why does it make sense that...?”
- “Why is this true?”

But you can also ask questions relating the new information to information you already know:

- “How does it relate to what you already know?”,
- “How is this different from/the same as what I’ve seen before?”
- “What information does this add to what I already knew”
- “Does this change anything I’ve seen before?”.

While reading, wonder why the things you are reading are true, whether you already knew something about it, whether this new information relates to something you have heard in the lecture or tutorial, etcetera. Describe how the ideas you are studying apply to your own experiences or memories.

### THE EXERCISE

Start reading a new text you brought for today. After each paragraph, stop to think/write/talk out loud about what you have read:

- What was new to you in this paragraph?
- Can you explain the new information in your own words?
- How does this relate to something you already knew?
- Why is what this paragraph said true?
- Are there other concepts that come to mind that are related in some way?
- Can you give two real-life examples?
- Think about the different concepts you are studying. Are they similar in some ways? Or how do they differ?



## Summarizing using the Cornell method

### THE STRATEGY IN SHORT



In summarization, students identify a text's main points, excluding unimportant material. Summarizing is a strategy to select the most important points and organize it. There are many different ways to summarize a text. For example, one can find the important sentences in the text to be read, and copy and paste them to another document. In this manner, summarization is barely different from highlighting and not effective for long-term learning. On the other hand, students can summarize by reading the text, thinking about it, attempting to understand it and then writing it down in their

own words, as if they were explaining it to themselves. This technique is then more closely related to elaboration.

### HOW TO DO IT RIGHT:

Summarizing can be helpful if you do it actively, for instance with the **read-recite-review method**: summarize the tutorial meeting or a chapter by recalling from memory what you remember. Then review your class notes and literature and edit the summary. That way, you *combined summarizing with practice testing yourself*.

The **Cornell-note taking technique** is also a *useful technique* as it supports active processing of the information. Do not reread your summary, but test yourself with the questions you have written in the column (again, a combination with practice testing) and check your answers with your summary.

### THE EXERCISE

Try to apply the Cornell method to an article that you have read before. To help you, ask your trainer (if he or she has not done so before) to show the [video](#) on manners of summarizing, as this video easily explains what we are going to do.

How to do it: start by writing the title of what you are summarizing at the top. Then you leave some space on one side of the page (left or right), and you use that space to write down keywords or test questions that pop up while summarizing. On the other (large) side of the line, you write your summary (the explanation of the keywords, the answers to your questions, possibly a visualization to help you understand). You could also take the learning goals from the pre-discussion as subheadings for your summary or write them on the side and try to answer them.

If then later you want to test yourself, you can simply cover the summary part of the page and explain the keywords and answer the questions (try it!). An important advantage of this method is that you can immediately check whether you answered correctly.

CUES:	NOTES:
	<b>Mordor</b>
who rules Mordor?	1. Government A. ruled by Sauron B. Has a tower
Who lives there?	2. People A. has orcs B. Has Trolls C. Has Nazgul
Can you visit?	3. Accessibility A. cannot simply be walked into.
	<b>SUMMARY:</b>
	Mordor is ruled by Sauron, is populated by orcs, trolls, and Nazgul, and cannot simply be walked into.

## Cornell note taking schema

Title:

<i>Keywords/questions</i>	<i>Summary / Notes</i>
<i>Conclusion / Take-away</i>	

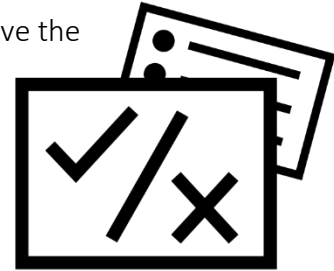
## Practice testing

### THE STRATEGY IN SHORT

The idea is to put away the materials and retrieve actively everything you know from memory (cued by open or multiple-choice questions, free-recall or quizzing with flashcards). Then, check the materials to see how accurate you were and whether you missed anything.

### HOW TO DO IT:

Finish and start each study session by answering 3-5 questions. Leave the questions in your "question pool" until you have been able to answer it correctly at least 3 times. Go back to the questions regularly: every two to three days in the beginning, building up to every week later in the process.



One possible method is using flashcards to test recall. Flashcards can be created either as physical or digital cards. Digital options are:

- <https://apps.ankiweb.net>
- [www.quizlet.com](http://www.quizlet.com)

Another option is answering the sample questions at the end of a textbook chapter. If no practice questions are available, break the learning goals from your tutorial down into sub goals and formulate questions. Or make questions yourself and share them with your peers. Another possibility is to combine this strategy with the summarizing strategy, using the 'Cornell method' (see summarizing). Make sure to challenge yourself and ask difficult questions and a mix between factual (simple facts, for example learning word combinations) and comprehension (showing you've really understood what you read, whether you can apply it to new situations, etcetera) questions.

### THE EXERCISE

Use an article you have read before (and possibly highlighted), and find important concepts (think about example, important terms, theories, mechanisms, relations between different ideas) in the text. Then make flashcards about these concepts. To support you in how to create flashcards, you can ask your trainer to show you one of the two videos on flashcards in the presentation of the first session.



On one side, you write the question, keyword, or concept (or maybe even a figure/graph), on the other side you write the answer/explanation. During this exercise, try to create flashcards that reflect everything that is in the article you have already read.

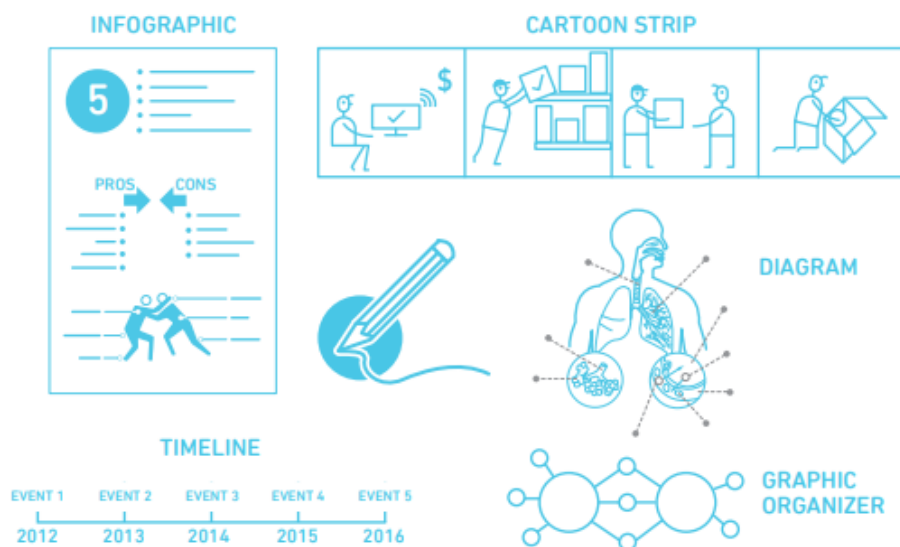
## The dual-coding method using visualizations

### THE STRATEGY IN SHORT

Students draw what they are learning, or create schematics and/or overviews. The effectiveness of the strategy depends on the manner in which it is executed. If you want to do it effectively, actively structure information you are studying into visuals and use the visuals to test yourself: explain the topic using the visual.

### HOW TO DO IT:

Structure your knowledge by drawing a process, combining or contrasting ideas in a mindmap, or creating graphs or diagrams. Try to come up with different ways to represent the information visually, for example an infographic, a timeline, a cartoon strip, or a diagram of parts that work together:



Picture: <https://www.learningscientists.org/>

Furthermore, when reading a text, make a visual out of it (graph/diagram/mindmap), when studying a graph or visual, then explain it in your words: *the dual-coding technique*. Combine it with retrieval practice and try to write and draw from your memory. That way, you make visualization more effective.

### THE EXERCISE

Use an article that you have already read. This strategy can be challenging, depending on the content of the text. Some texts are easily converted into graphics, other texts are much more difficult. Therefore, before you choose this strategy to practice with, really think about whether you have a text that lends itself for this technique.

If visualization is possible, focus on the important concepts in the text, the main message of the text, and think about a type of graphic that you can use (see picture above). Then start drawing it, and make sure that you can later explain what you have drawn.

## Planning how to apply distributed practice and interleaved practice

### THE STRATEGY IN SHORT – DISTRIBUTED PRACTICE

Students often “mass” their study—in other words, they cram. Distributed practice is the exact opposite of this: start studying long enough before exams to be able to study the material several times for a shorter amount of time. For example, five hours spread out over two weeks instead of five hours in one go.

To remember something for one week, learning episodes should be 1 to 2 days apart. Although it may not seem like it, you actually do retain information even during these long intervals, and you quickly relearn what you have forgotten. Long delays between study periods are ideal to retain fundamental concepts that form the basis for advanced knowledge. This is what it would look like:



Picture: <https://www.learningscientists.org/>

### HOW TO DO IT – DISTRIBUTED PRACTICE:

You will have to plan ahead: plan a little bit of time every day to review information. This strategy is easily applicable in PBL: after you review information from your most recent class, make sure to go back and study important older information (for example the previous task, or a few tasks ago). Take the last 15 min of a study session to review materials from the week before. Start early and set aside a bit of time every day, even if your exams are far away. Of course, it is easy to forget to do these repetitions, so make sure that you have a study schedule that reminds you to go back to the information, and turn it into a habit! Distributed practice may feel difficult and you will forget things in between the study sessions, but this is a good thing. This forces you to retrieve the information from memory and strengthens your memory.

### THE STRATEGY IN SHORT – INTERLEAVED PRACTICE

Simply put, the idea is to vary the subjects you’re studying. So don’t dwell on one subject too long, study it, study something else, and come back to the first subject later. It is important, however, not to change too quickly: make sure you understand the first subject before moving on to the next. If you go back to the material you already studied, try studying the subject in a different order. Doing so will help students make links between subjects, see the differences and similarities (which they can then think about and *elaborate* on). This is what it looks like:



Picture: <https://www.learningscientists.org/>

#### HOW TO DO IT – INTERLEAVED PRACTICE:

An example could be: college students who have to learn to compute the volumes of four different geometric shapes. In a so-called blocked-practice condition, they finished all the problems for one shape before moving on to the next. In interleaved practice, the problems were intermixed, changing from shape to shape. That way, students have to think before solving each problem, how to solve it and do not blindly apply a formula they have used before.

#### THE EXERCISE

Plan, either by yourself or with peers or with your trainer, how you can include distributed as well as interleaved practice in your actual calendar. Really think about what you can do, how you will do it, what the problems may be, how to deal with those.

Also, keep in mind to do it in small steps: start by repeating a little bit, and start setting aside more and more time as it starts feeling more familiar. Really turn it into a habit, that will make it more sustainable.