



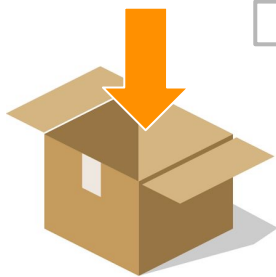
EXPLOELEVATE
INNOVATIVE SCHOOLS COOPERATIVE

REMEMBER MORE!

Retrieval Practices for Deeper Learning

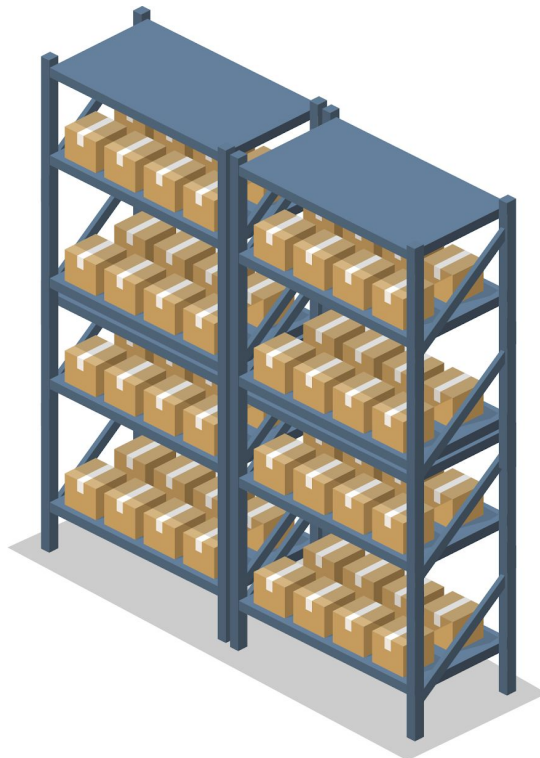
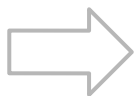


@EXPLOelevate



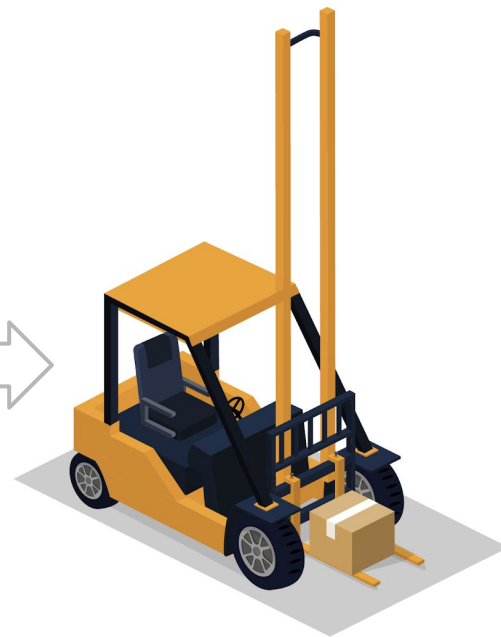
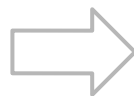
Encoding

Initial learning
of information



Storage

Maintaining information
over time



Retrieval

Accessing information
when needed





RETRIEVAL

Recalling learned information from memory when needed.



Retrieval is important



Learning is altered by the act of retrieval.



Retrieval helps people create the kind of deep learning necessary to solve new problems and draw new inferences.



Source: Roediger, H. L. III, & Karpicke, J. D. (2006). Test-enhanced learning: Taking memory tests improves long-term retention. *Psychological Science*, 17(3), 249–255. <https://doi.org/10.1111/j.1467-9280.2006.01693.x>



What does retrieval look like?



Spaced Retrieval Experiment

The key question in this research was, how well would students remember the vocabulary word translations in the long term?

Source: Karpicke, J.D., & Bauernschmidt, A. (2011). Spaced retrieval: Absolute spacing enhances learning regardless of relative spacing. *Journal of Experimental Psychology: Learning, Memory, and Cognition*, 37(5), 1250-1257. doi:10.1037/a0023436.

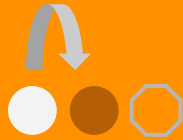


Spaced Retrieval Experiment



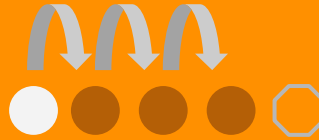
Study Once

Students studied words once, without trying to recall them.



Recall Once

Students studied and recalled words until they recalled all of them once.



Massed Retrieval

Word was recalled, then students practiced retrieving the words immediately, three times in a row.

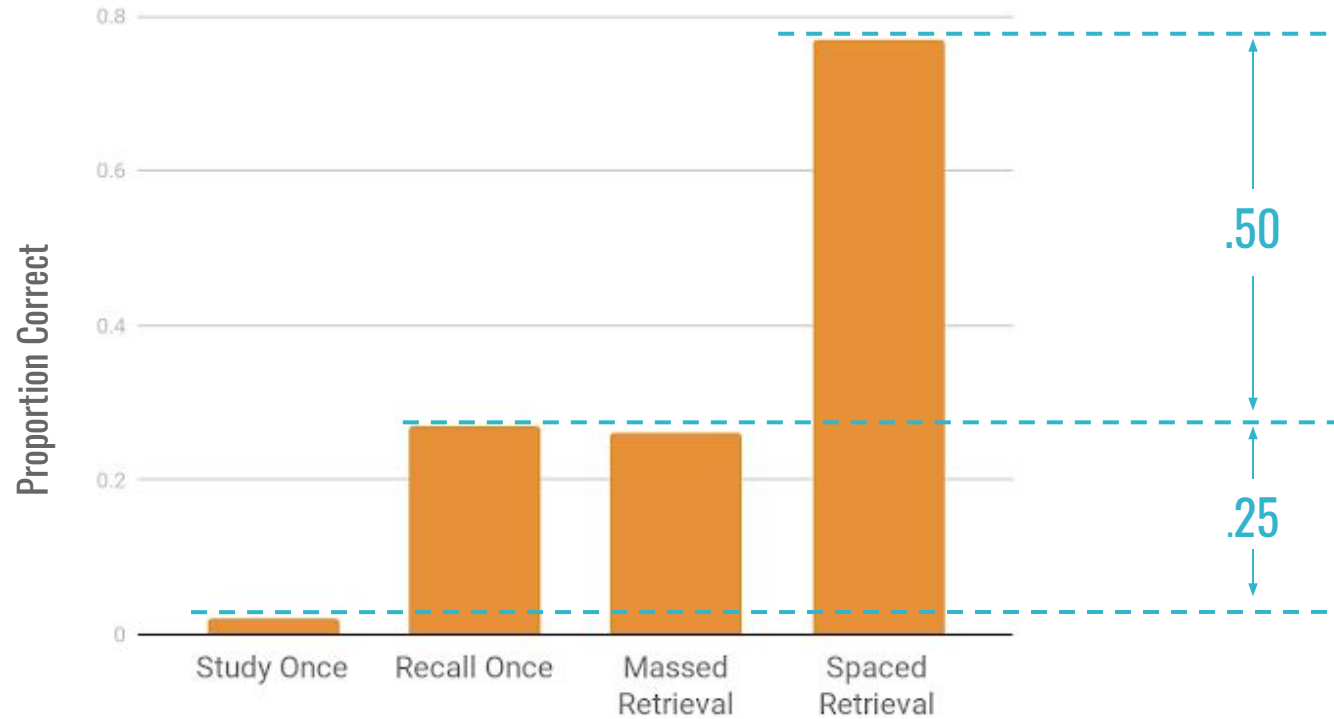


Spaced Retrieval

Repeated retrievals spaced throughout the learning session. Once correctly recalled, students move on. Prompts to practice retrieval pop up at future intervals.



Spaced Retrieval Experiment



Karpicke, J.D., & Bauernschmidt, A. (2011). Spaced retrieval: Absolute spacing enhances learning regardless of relative spacing. *Journal of Experimental Psychology: Learning, Memory, and Cognition*, 37(5), 1250-1257. doi:10.1037/a0023436.



Retrieval vs. Elaborative Studying

Students studied science topics using one of two strategies: retrieval and concept maps. The students spent the same amount of time studying in the two conditions; the difference was whether they created concept maps or practiced active retrieval.

Source: Karpicke, J.D., & Blunt, J.R. (2011). Retrieval practice produces more learning than elaborative studying with concept mapping. *Science*, 331(6018), 772-775.
doi:10.1126/science.1199327.

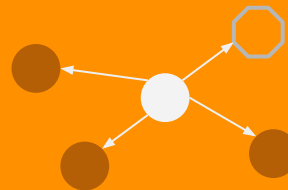


Retrieval vs. Elaborative Studying



Retrieval

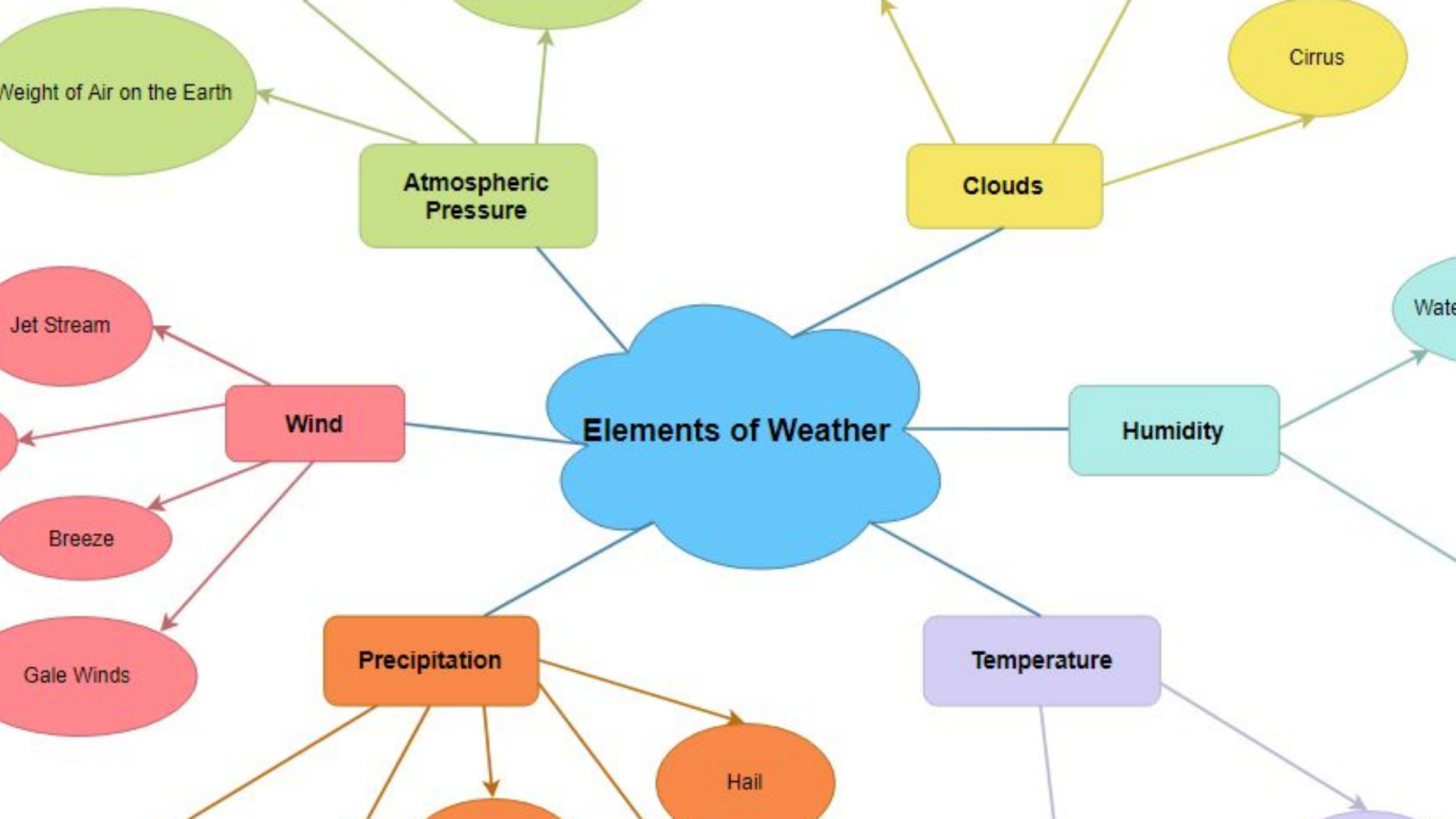
Students read a text, set it aside and spent time recalling and writing down as much as they could remember from it. They then reread the text and recalled it a second time.

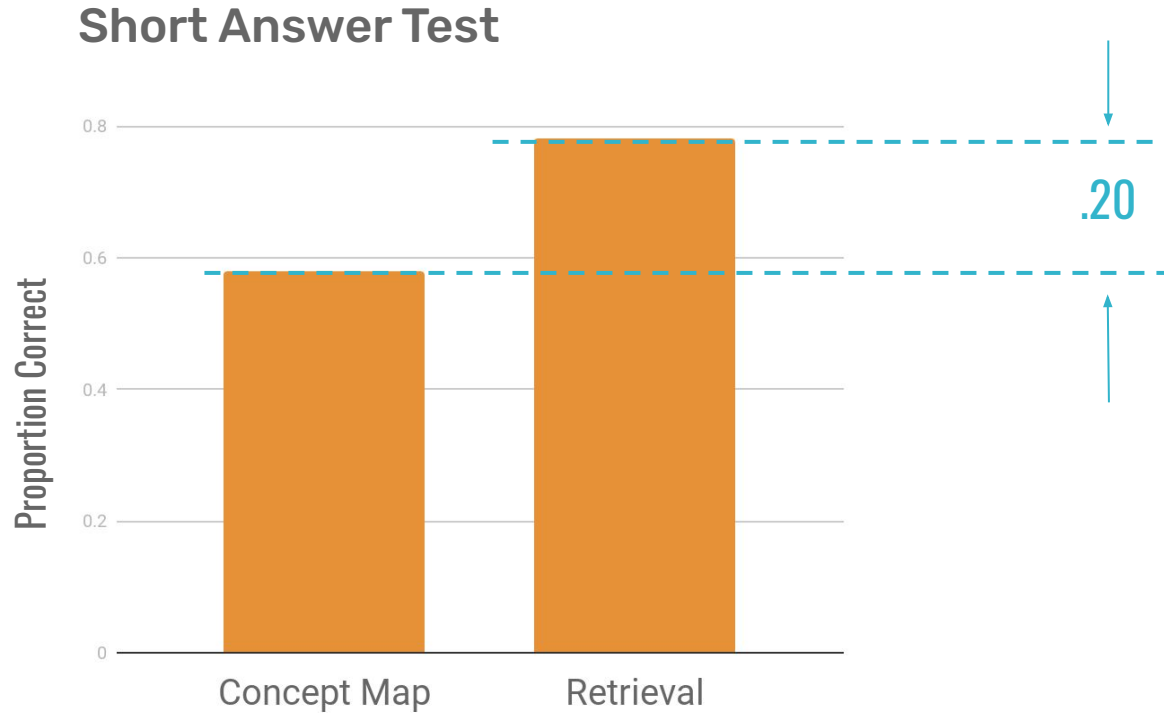


Concept Maps

Students created concept maps while they read the texts.

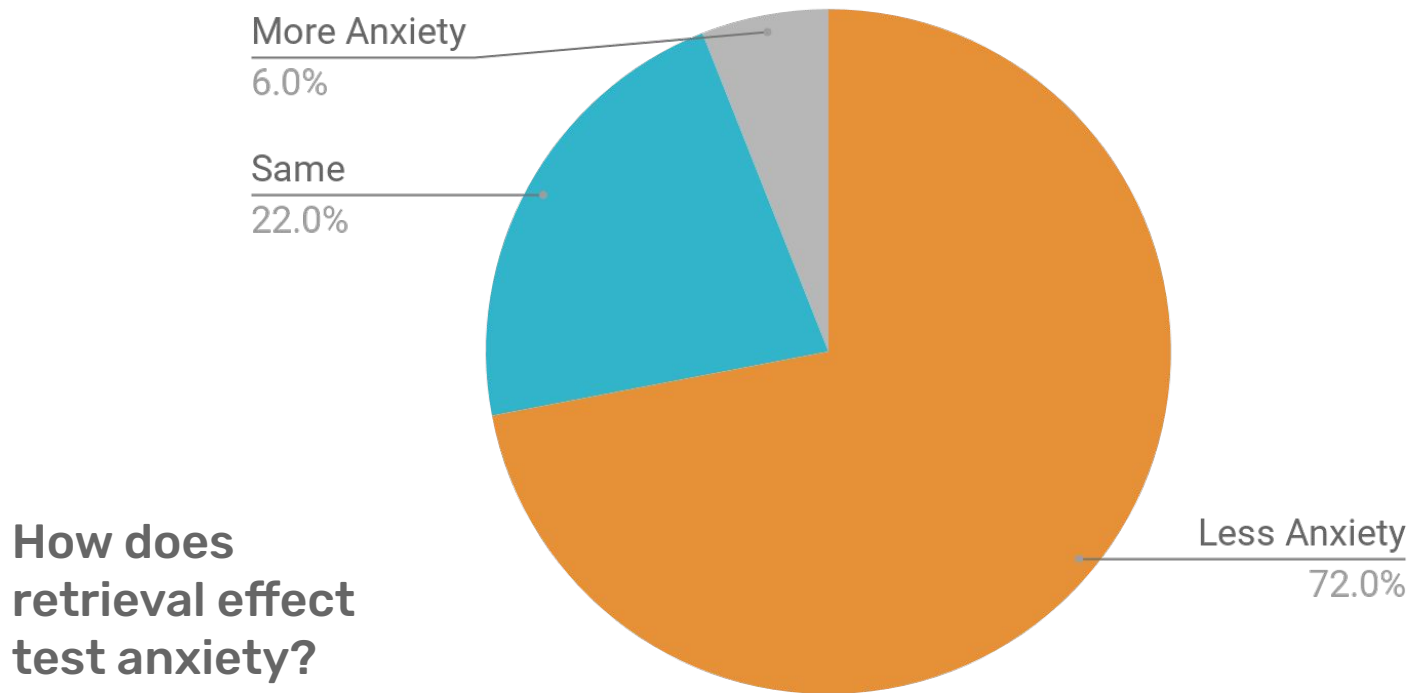






Source: Karpicke, J.D., & Blunt, J.R. (2011). Retrieval practice produces more learning than elaborative studying with concept mapping. *Science*, 331(6018), 772-775. doi:10.1126/science.1199327.





Reflective Practice Thesis

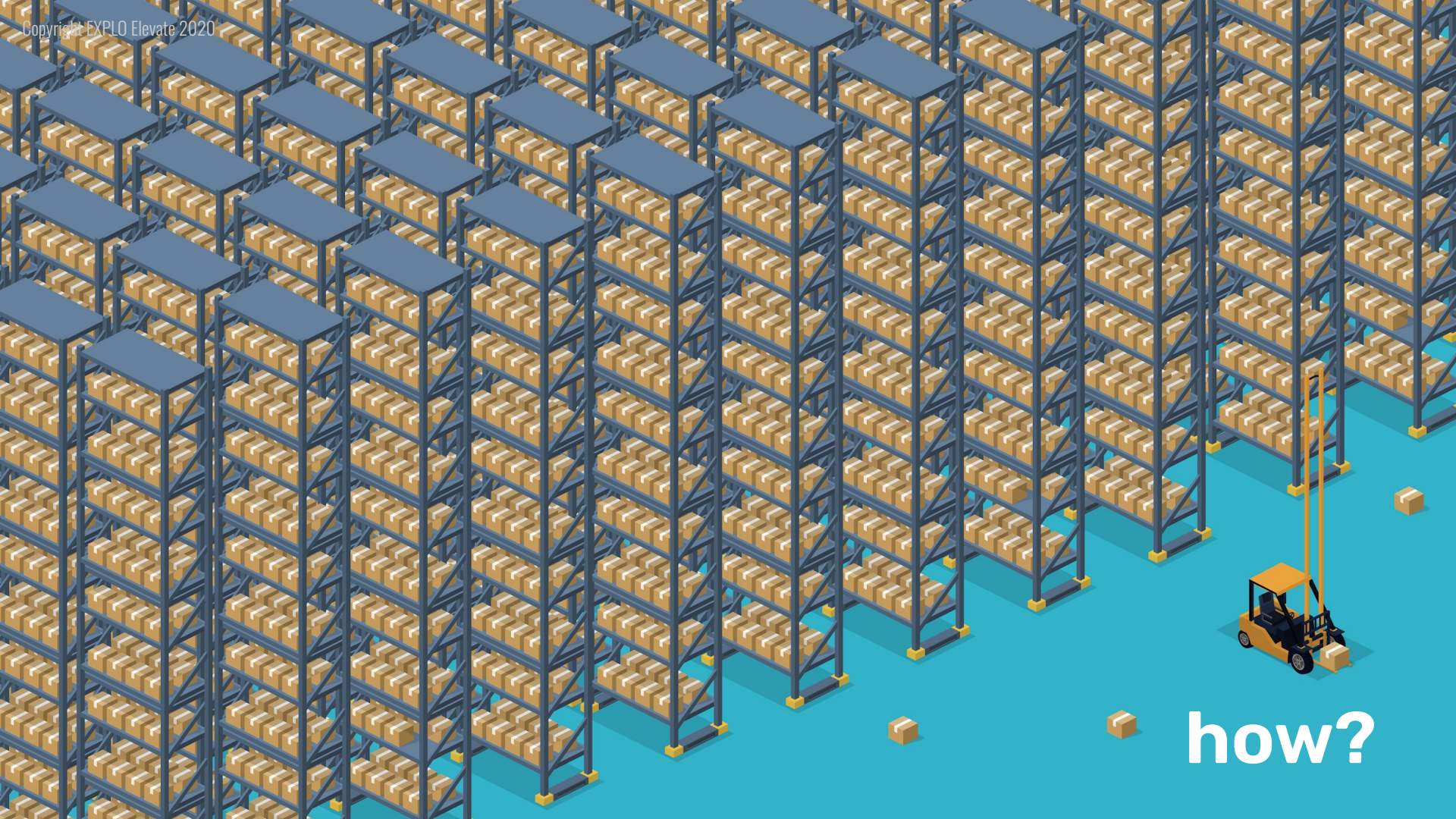
Give students the control over what they know. Let them tell us what they know and let them tell us over and over again.



Summary

1. Retrieval practice is about learning, not just assessment
2. Spaced retrieval is the best
3. Retrieval is not just for rote learning → it can promote higher order thinking and deeper learning
4. It can decrease test anxiety - when done in a low stakes way



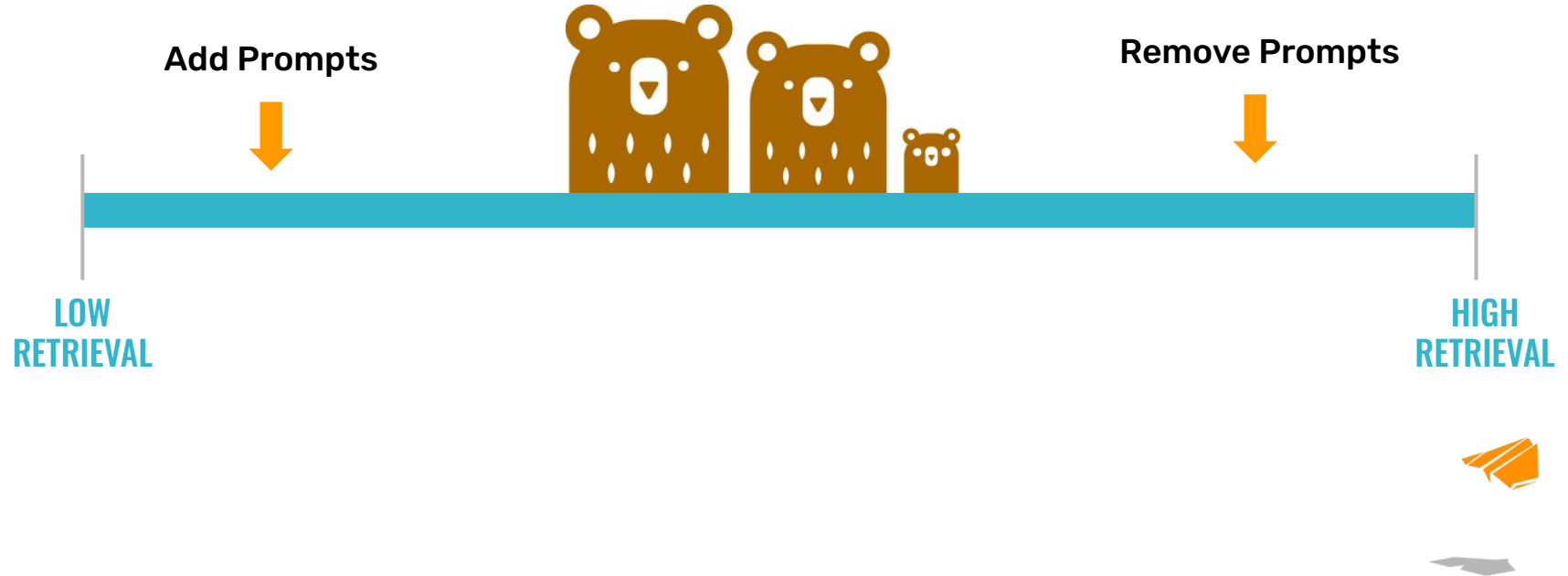


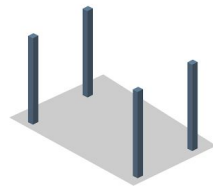
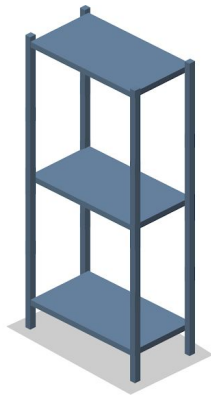
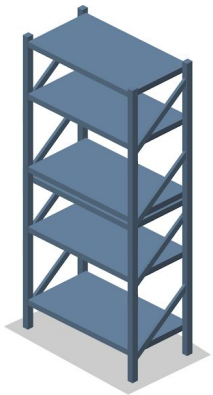
how?

How might we incorporate retrieval into our classrooms?



What's the right amount of difficulty for a retrieval exercise?

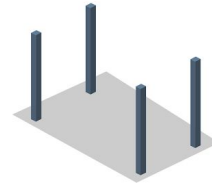
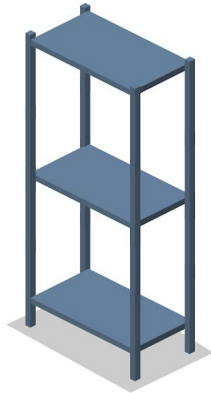
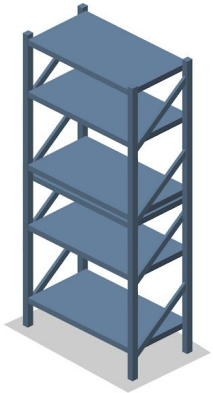




Start with too many prompts and reduce over time.

- Ensures initial success
- Ensures multiple repeated retrievals = good for learning

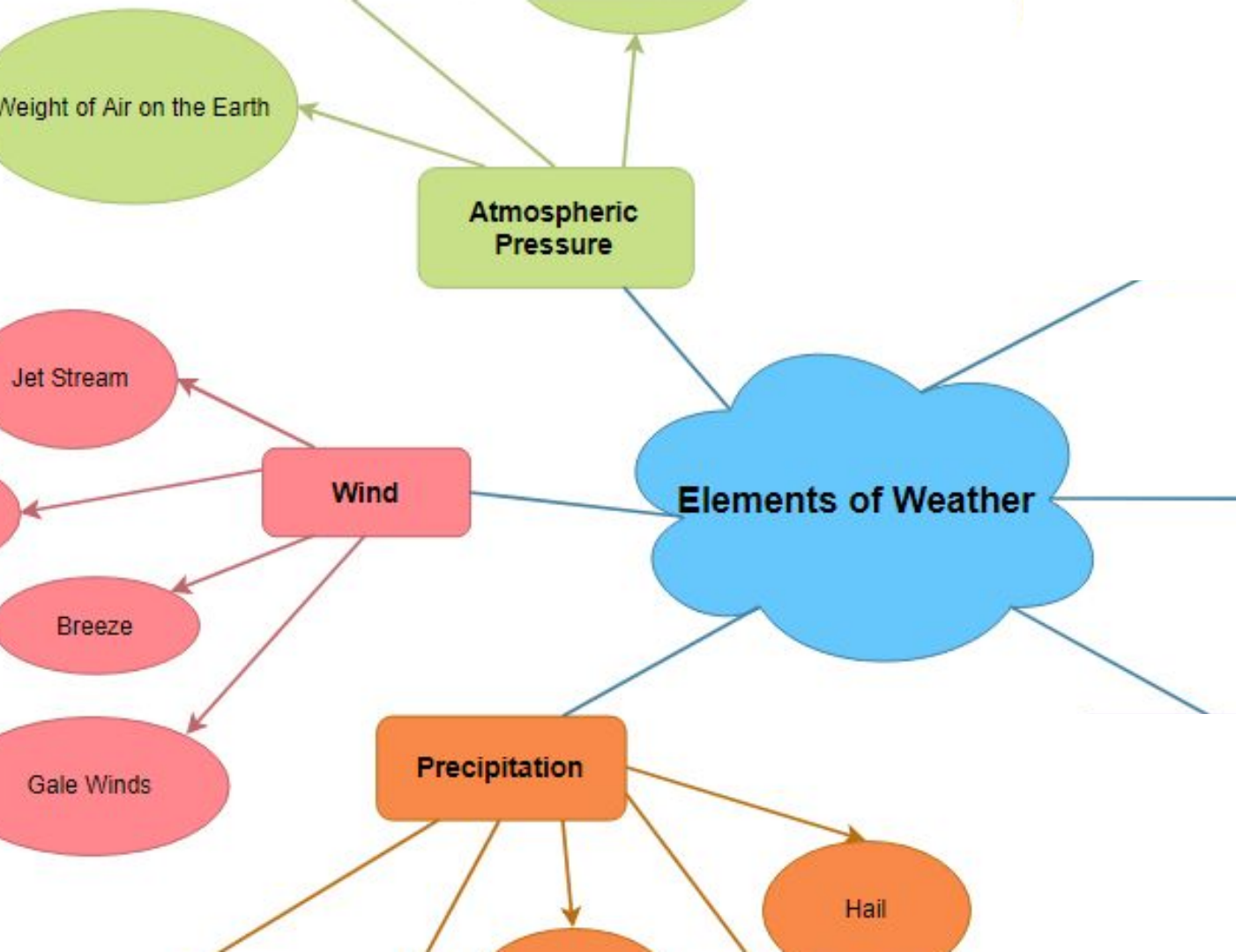




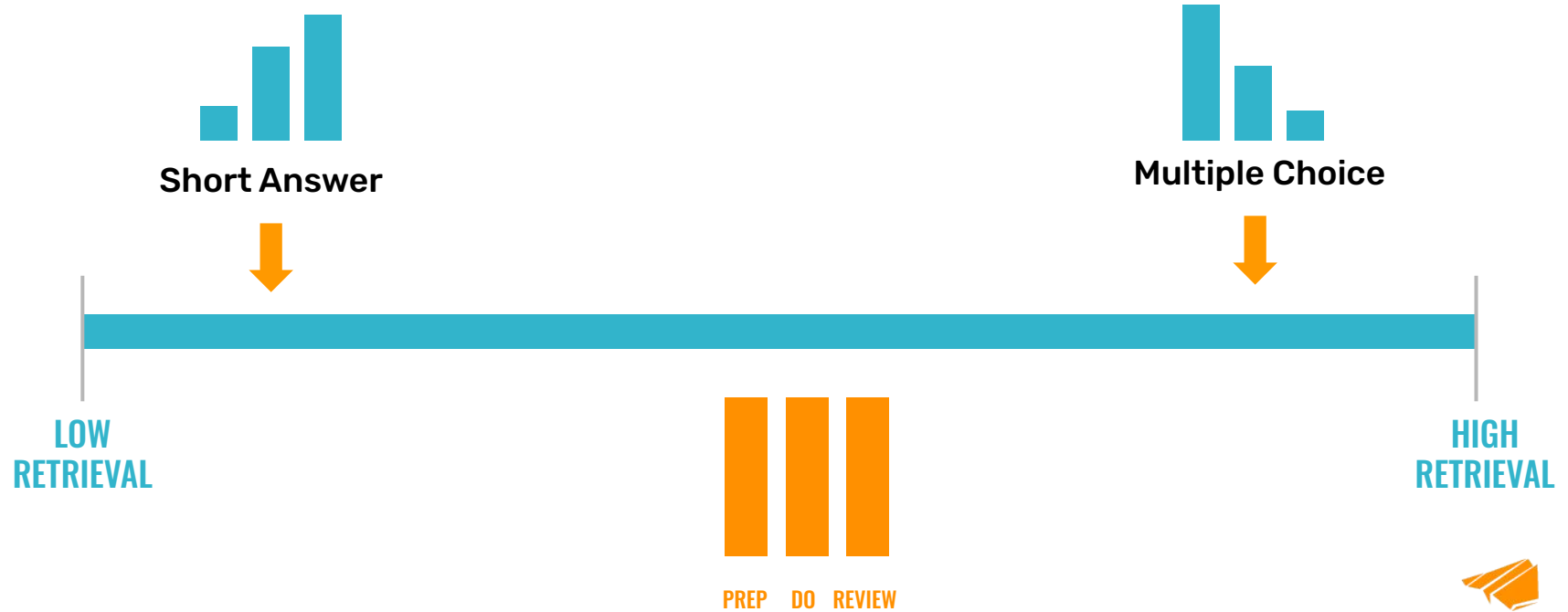
Sample Prompts

- Write down everything you can remember about a this topic in the next 2 minutes.
- Write 3 main takeaways from yesterday's class.
- What are 2 ways in which what we are discussing now relates to what we discussed last week?
- Tweet a summary of yesterday's class (must be less than 240 characters).
- What are two questions related to this topic that you're wondering about?

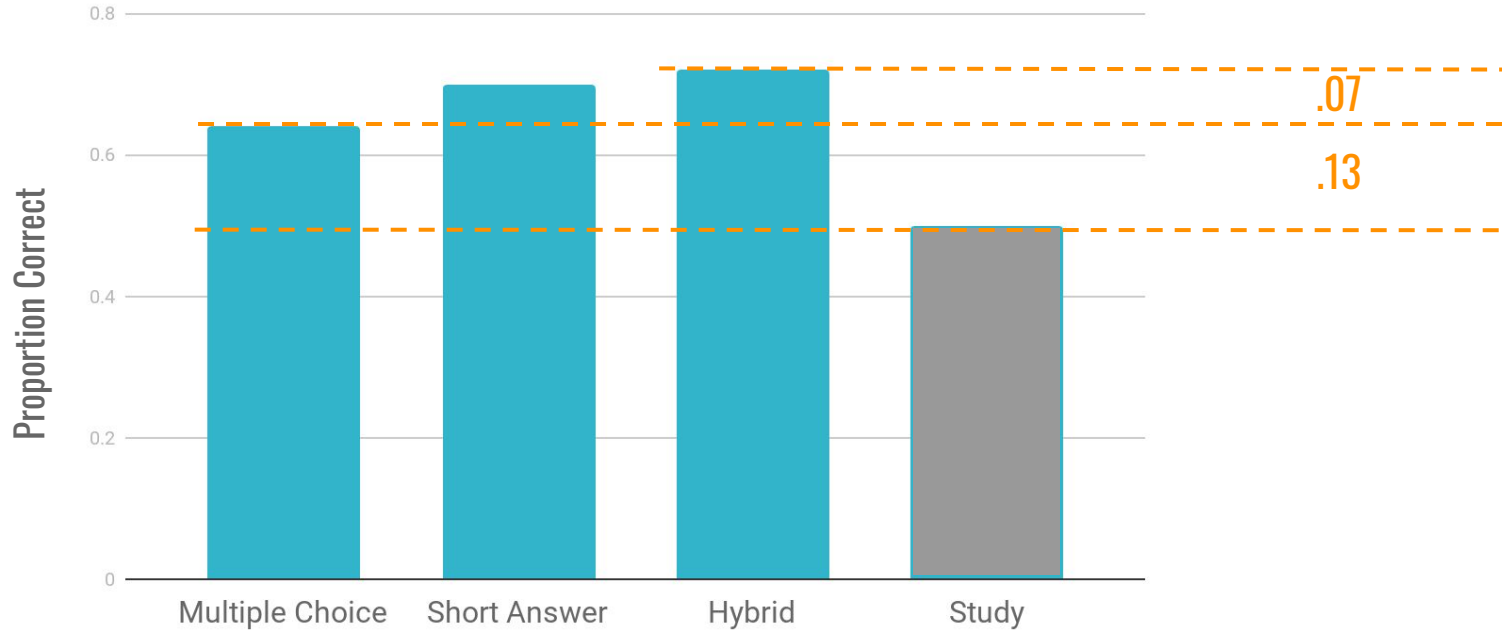




What's the best format for a retrieval exercise?



What's the best format for a retrieval exercise?



(2) Smith, M. A., & Karpicke, J. D. (2014). Retrieval practice with short-answer, multiple-choice, and hybrid tests. *Memory*, 22, 784-802.



Multiple Choice for Higher Order Thinking

Reason + Why

Before: Select the most effective tone for writing technical documentation.

After: Which paragraph and reasoning best demonstrates how to start a technical document.

Analyze Visuals

Before: Which country has the largest population?

After: What does this graph predict about world population in the year 2020?

Real World Scenarios

Before: Which country has the largest population?

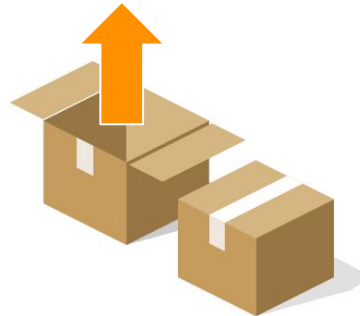
After: What does this graph predict about world population in the year 2020?



FREE RECALL

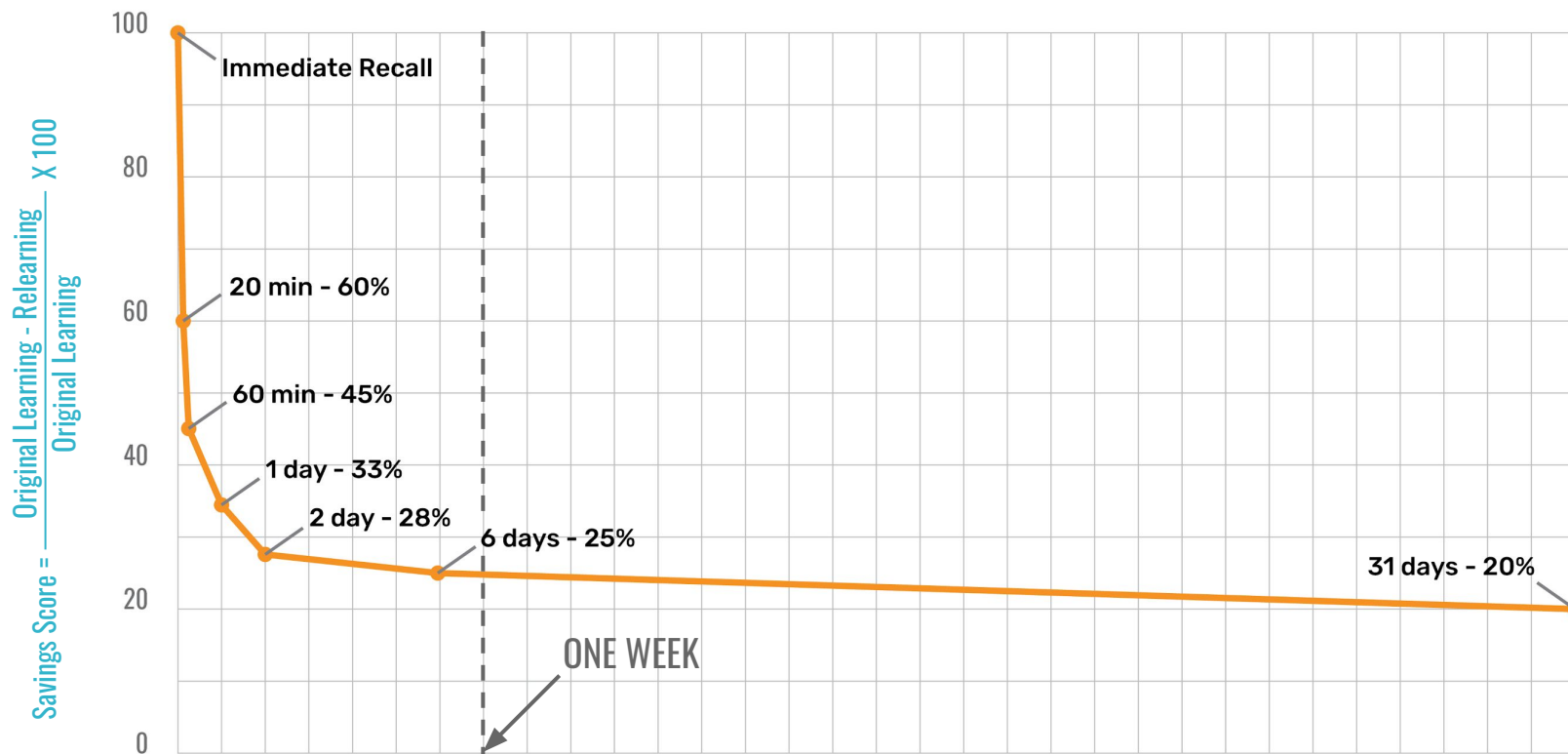
Pause your lesson or activity and ask students to write down everything they can remember so far.

- **ADD SPACING:** Ask students to write down what they can remember from *yesterday*.
- **ADD FEEDBACK:** Ask students to discuss their similarities and differences with each other ("turn and talk") for a minute or two before moving on



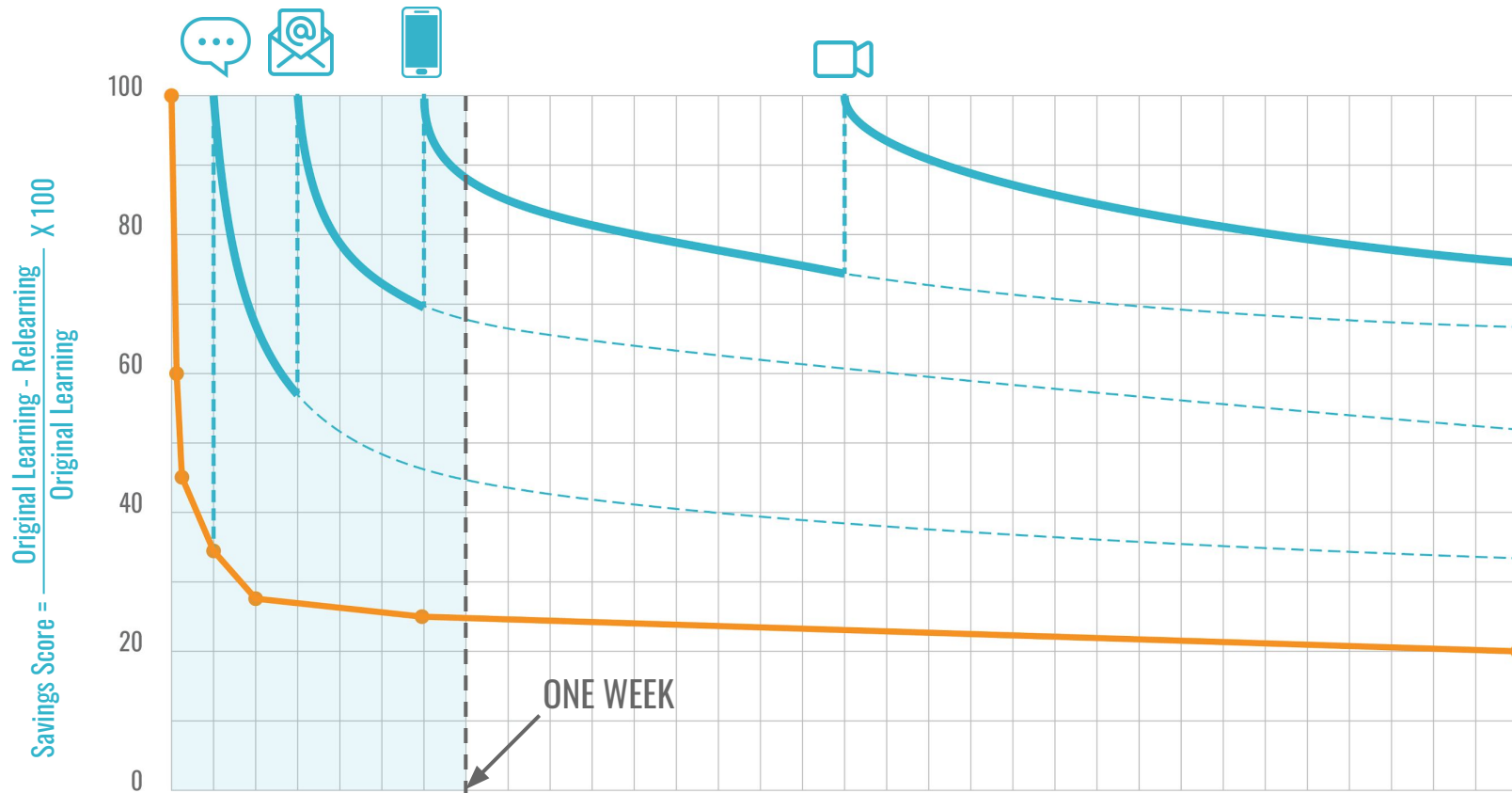
What's the right amount of space in spaced retrieval?





Forgetting Curve





Spaced Retrieval Practice



Flash Cards

Puella
Feminine
First

$$8 \times 7 =$$



Know it



Don't know
it



Waterfall

Know it

Know it

**Don't know
it**



Waterfall

Know it

Know it

Know it



Waterfall

Know it

Know it

Know it



Waterfall

Know it

Know it



Waterfall

Know it



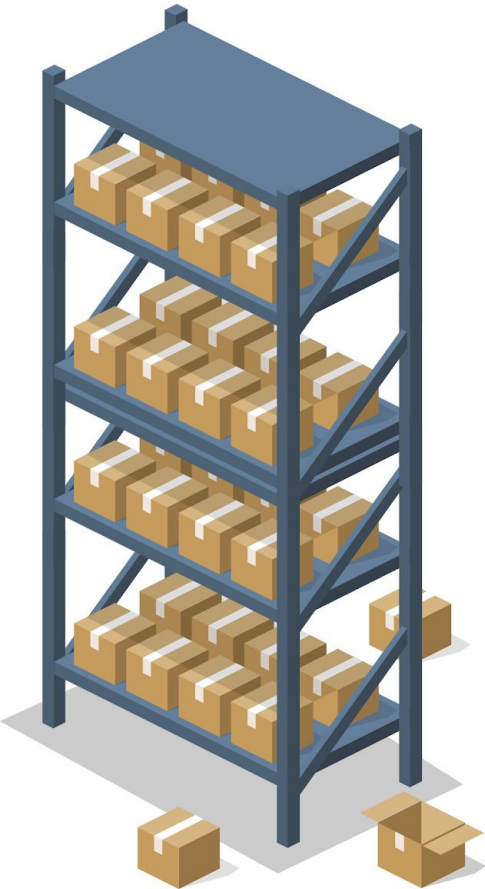
2x

4x

6x

8x





Thank you

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 @EXPL0elevate

