

*Infinite know how
for school*

ExQ® Know How (To Learn More) Webinar #3: The Science of Studying

Sucheta Kamath
Founder & CEO, ExQ®

October 15, 2019



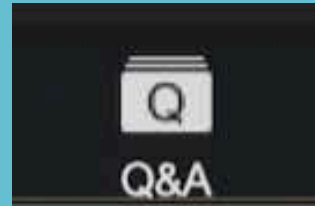
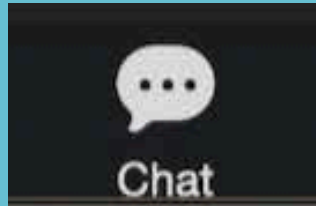
TEST YOUR **EXECUTIVE FUNCTION!**

Test Your EF:
Learn Something New About YOU!

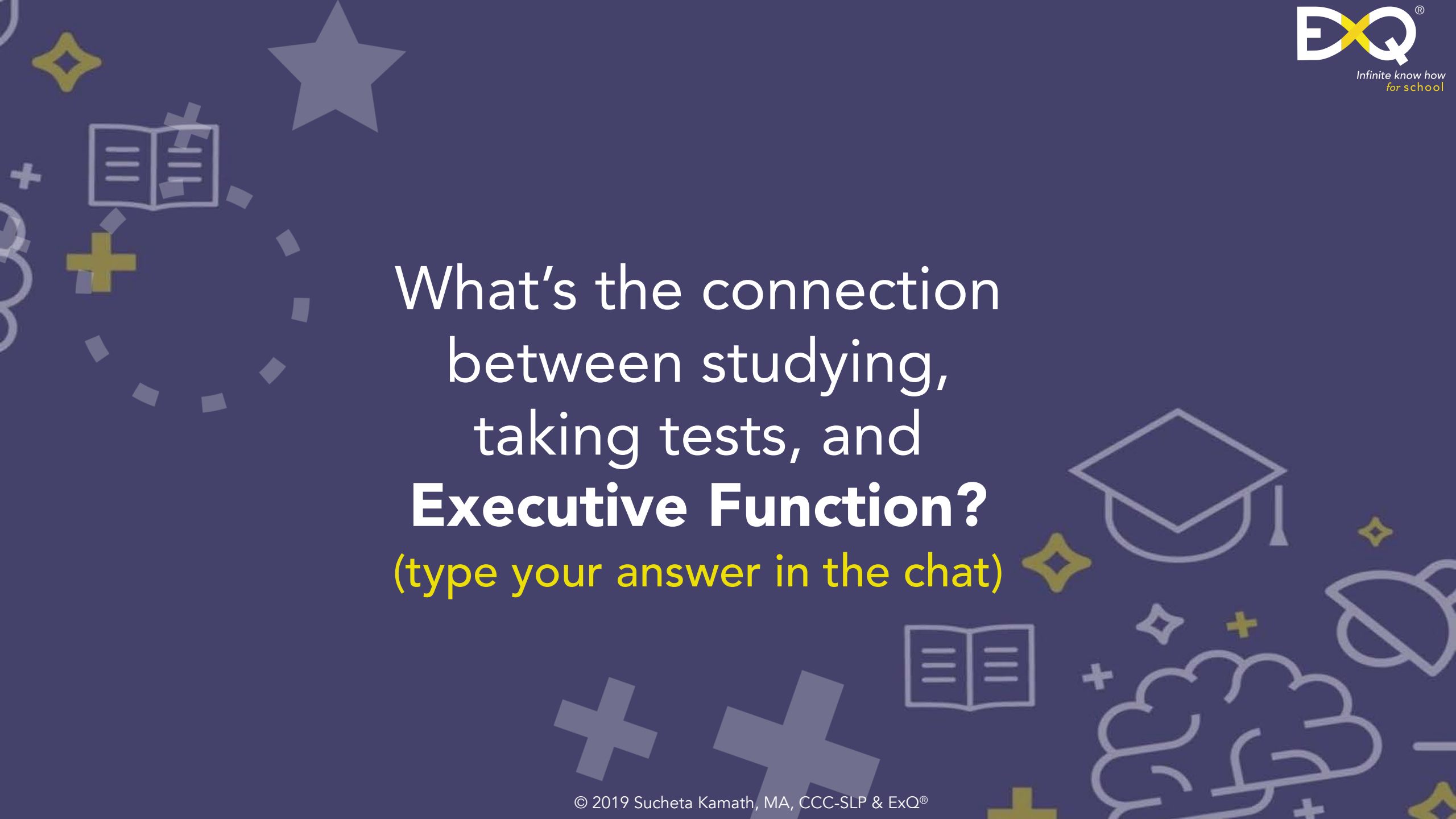
www.exqinfiniteknowhow.com/test-your-executive-function/

ZOOM WEBINAR BASICS

At the bottom of your screen you'll see these buttons:



1. Use Chat to make comments to me or each other
2. Use Q&A to ask me questions




What's the connection
between studying,
taking tests, and
Executive Function?
(type your answer in the chat)




Executive Function
is how efficiently you do
what you decide to do.

- Neglieri & Goldstein, 2012



If you decide you want to do
well on a test, how efficiently
you study for it is
determined by strong
Executive Function skills.





Studying is using Executive Function to coordinate and orchestrate effort to make meaningful connections between past knowledge and new learning. Then, to SHOW or demonstrate what the student knows and how well he or she can adapt *knowing* through test taking.

- Sucheta Kamath

Why Test?

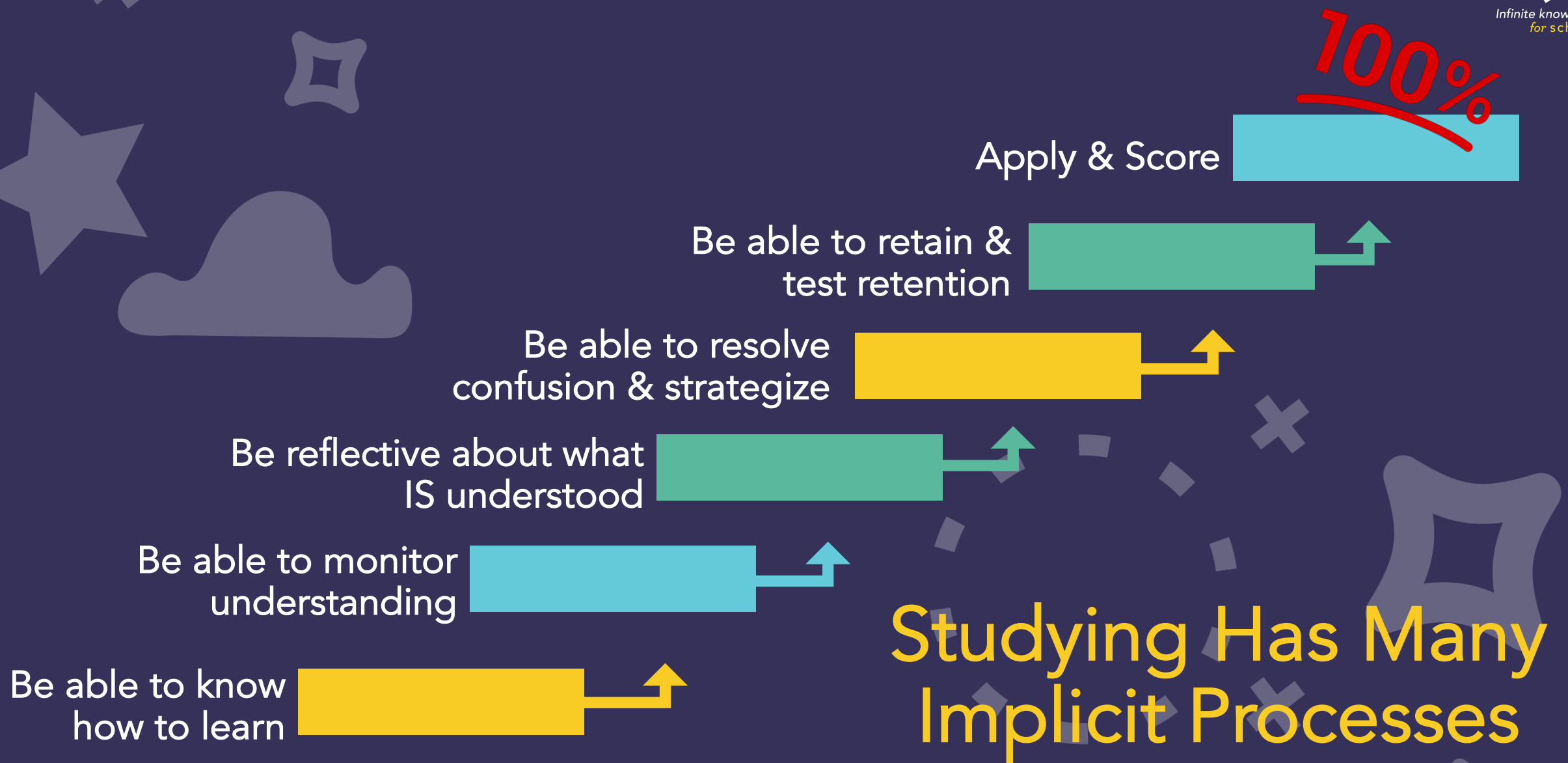
To ensure learning,
understanding and
retention. To build
knowledge!




But why is
studying so
elusive?



But why is
studying so
elusive?
**Because it's
complicated.**





What are some
strategies that
students use that
are not effective?
(type your answer in the chat)

STUDY MYTHS

Study strategies that may feel good but have very little benefit



Not-so-good Strategy #1: **Highlighting & Underlining**



COFFEA

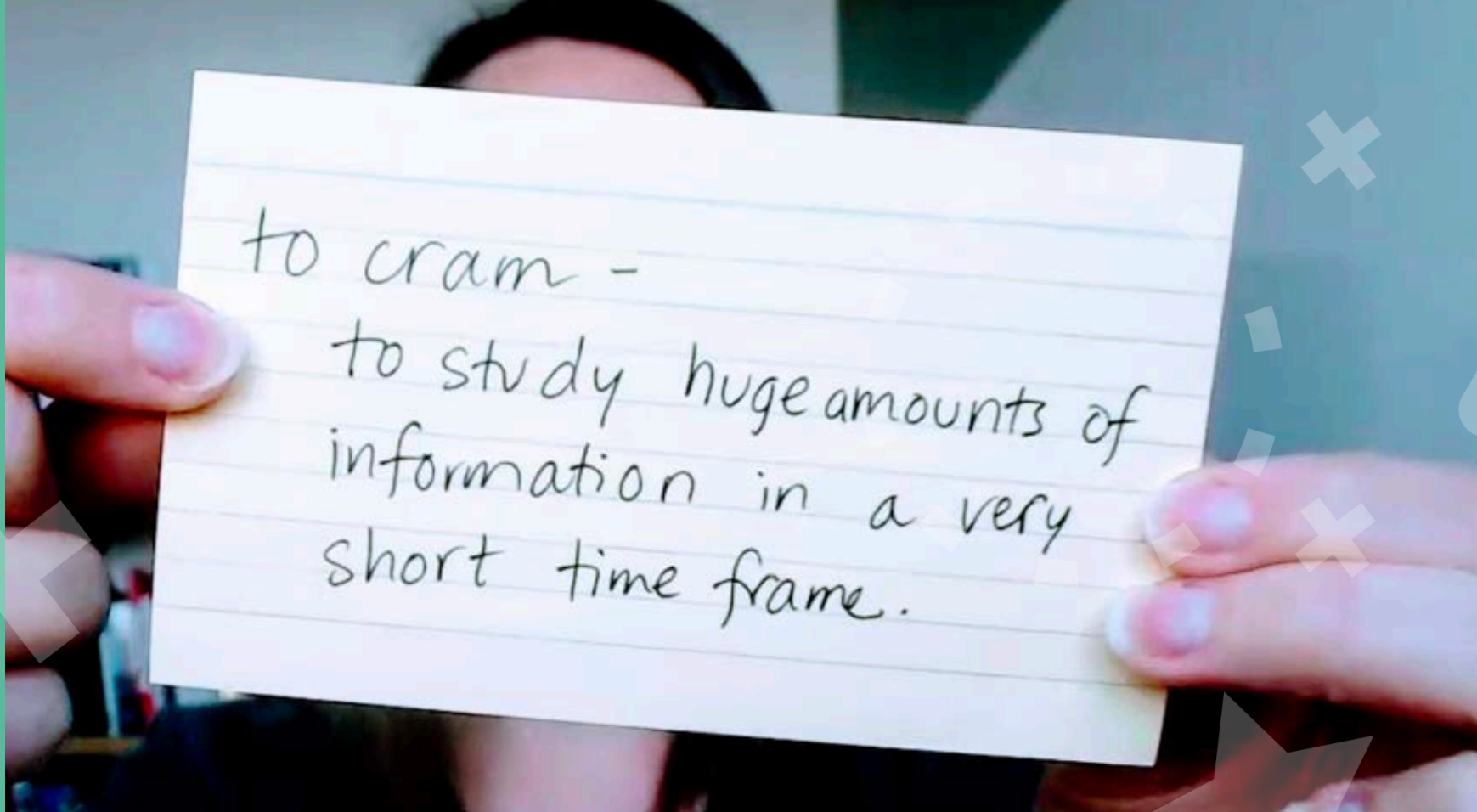
young tree

starts

seedlings



Not-so-good Strategy #2: Rereading or looking over notes



Not-so-good Strategy #3: **Cramming**



Not-so-good Strategy #4: Summarization

Why do you think
study strategies
might not be taught
in school *explicitly*?

(type your answer in the chat)

The teacher's role in teaching study strategies



PODCAST RESOURCES



<http://www.fullprefrontal.com/podcast/episode-55/>

STUDYING EFFECTIVELY

Study strategies that work

#1

PROMOTE “HOW TO LEARN” MINDSET

Help students understand how learning, effort and memory works.





Teach students to
value and create a
distraction-free
work zone.



Share with students
the idea of memory
and the “division of
labor” in the brain

PODCAST RESOURCES

Podcast Episode 37 cover with an orange background. It features a circular portrait of Roy Baumeister, Ph.D., a man with a grey beard and blue shirt. The text "Tune in to listen to" is above the title "PODCAST EPISODE 37:". Below the title is "ROY BAUMEISTER, Ph.D. Self-Control: Antidote for Self-Sabotage and Imprudence". The "Full Prefrontal with Sucheta Kamath" logo is in the bottom right corner.

Tune in to listen to

**PODCAST
EPISODE 37:**

ROY BAUMEISTER, Ph.D.
Self-Control: Antidote for Self-Sabotage and Imprudence

Full
Prefrontal
with Sucheta Kamath

<http://www.fullprefrontal.com/podcast/episode-37/>

Podcast Episode 38 cover with a dark purple background. It features a circular portrait of Roy Baumeister, Ph.D., a man with a grey beard and blue shirt. The text "Tune in to listen to" is above the title "PODCAST EPISODE 38:". Below the title is "ROY BAUMEISTER, Ph.D. A Blueprint for Success". The "Full Prefrontal with Sucheta Kamath" logo is in the bottom right corner.

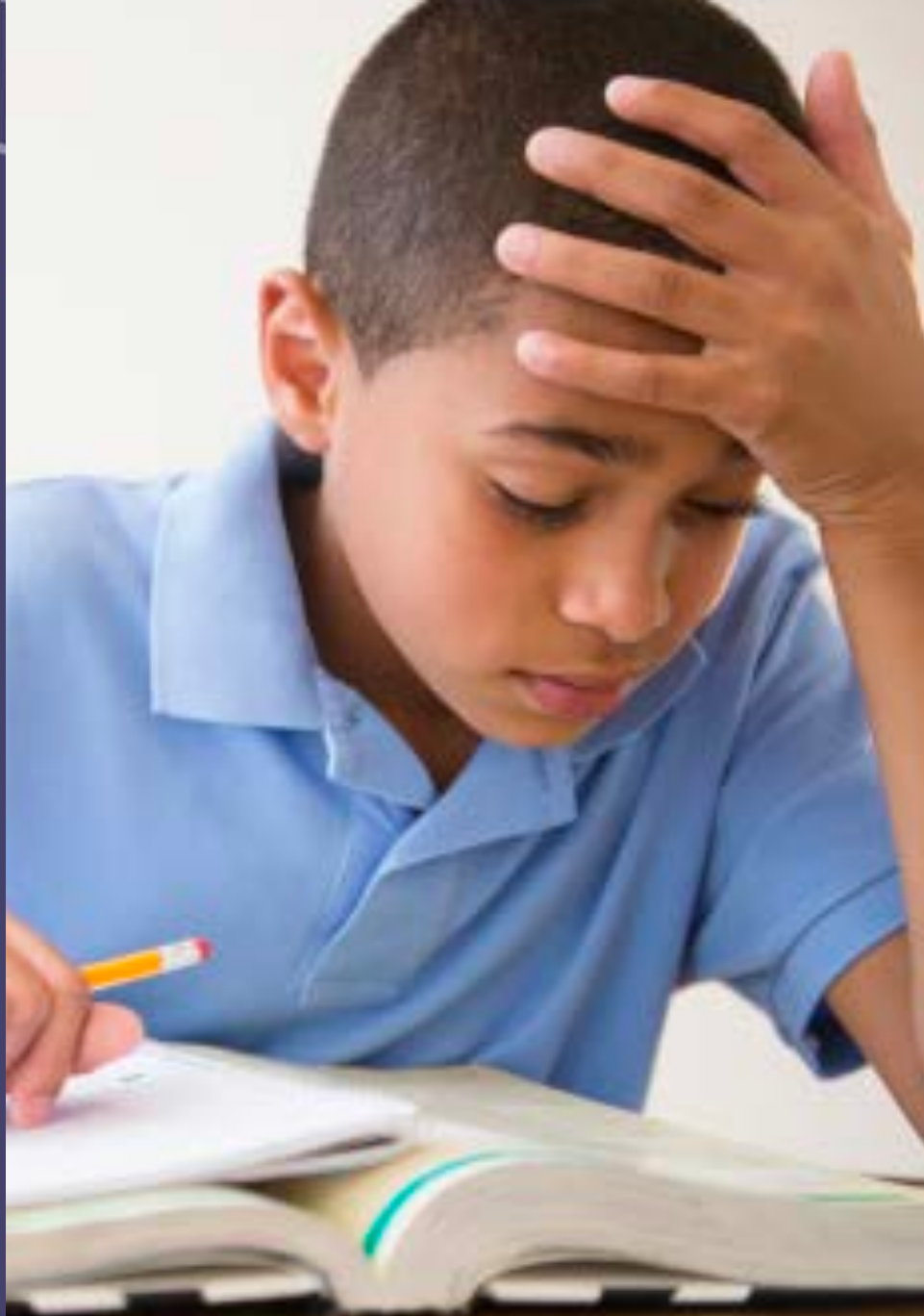
Tune in to listen to

**PODCAST
EPISODE 38:**

ROY BAUMEISTER, Ph.D.
A Blueprint for Success

Full
Prefrontal
with Sucheta Kamath

<http://www.fullprefrontal.com/podcast/episode-38/>



Help students
connect good
grades with strong
preparation and
know that bad
grades can be fixed

PODCAST RESOURCES



<http://www.fullprefrontal.com/podcast/episode-62/>

#2

TEACH RETRIEVAL PRACTICE

To examine retention
of new learning, one
must practice retrieval
(when it's not needed)





Research shows that
repeated testing
produced better
transfer than
repeated studying

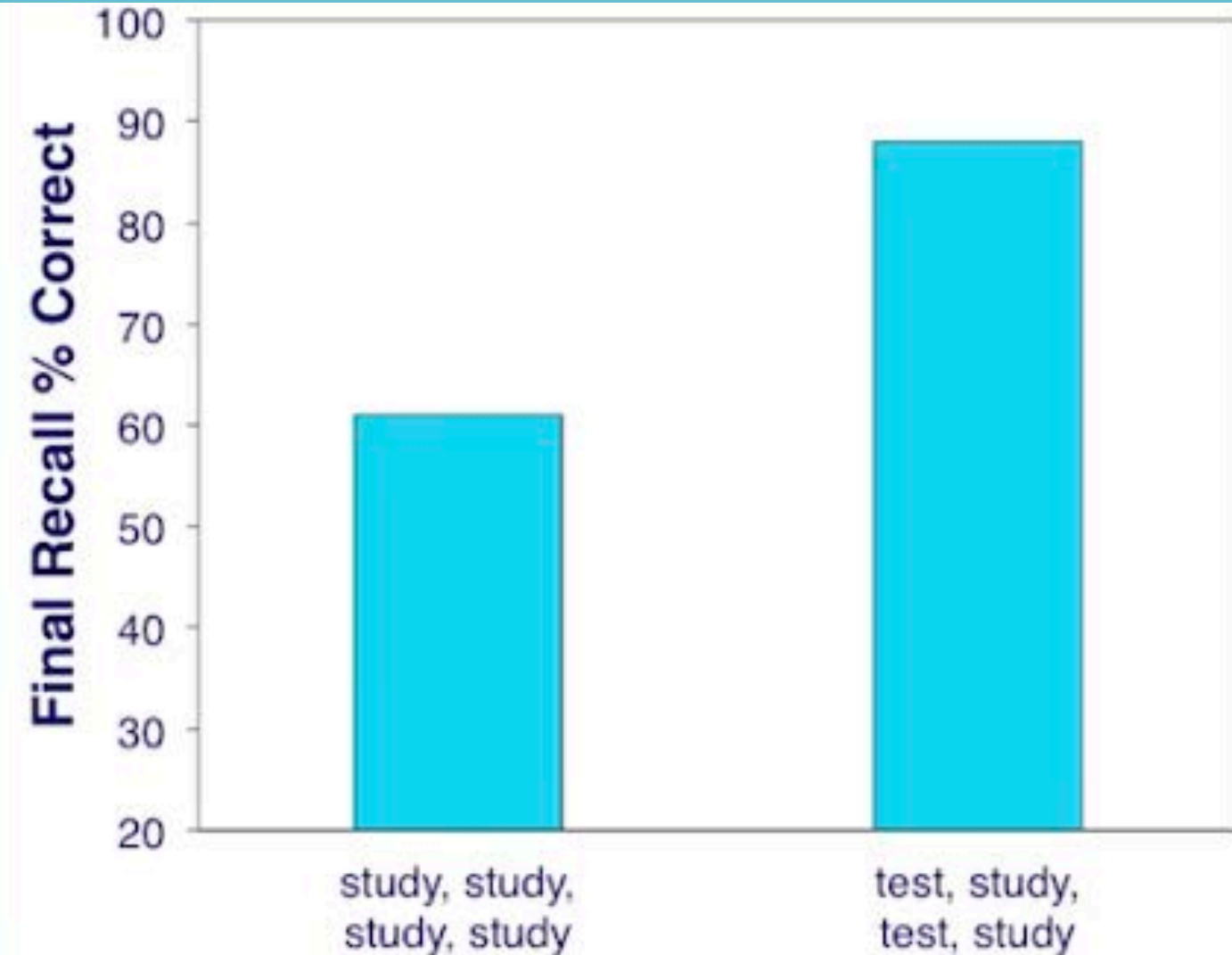
- Butler A.C. (2010)



Retrieval Practice is Effective when:

- It is followed by feedback
- The responses are (eventually) correct

- McDaniel et al. (2011)



Identical time on tasks but two different methods yield different results:

Study-study-study-study
Test-study-test-study

- Karpicke (2009 JEP: General)



Welcome to Starbucks

OUR STORE HOURS

Monday	5:00 am - 9:00 pm
Tuesday	5:00 am - 9:00 pm
Wednesday	5:00 am - 9:00 pm
Thursday	5:00 am - 9:00 pm
Friday	5:00 am - 9:00 pm
Saturday	5:00 am - 9:00 pm
Sunday	6:00 am - 9:00 pm

WE'RE HIRING

Be part of something bigger.

Service Animals

NEWS NOW



#3

DISTRIBUTED PRACTICE

Space the practices by intentionally creating a gap between learning and review of learning





Benefits of Distributed Practice:

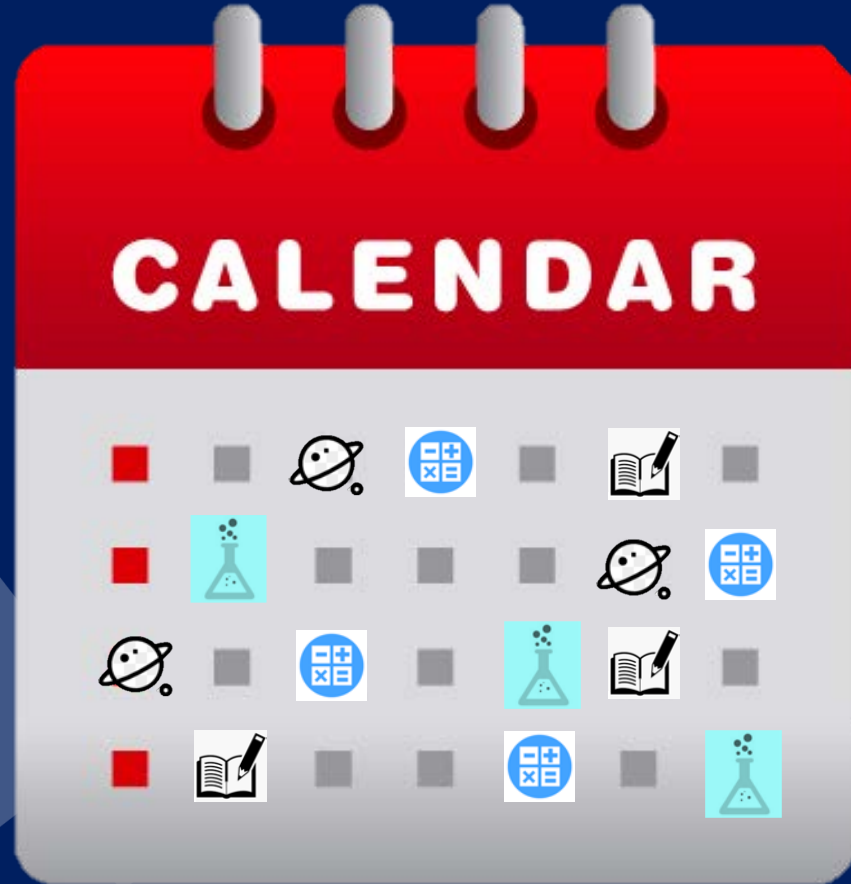
- Essential for long-term retention
- Most effective when:
 - Practice is distributed ACROSS sessions
 - Distributed practice involves Effective Strategies

- John Dunlowsky



Distributed Practice elsewhere





Spreading studying
over time has the
most benefit!

- John Dunlowsky



If the student plans to cram for a math test by spending 4 hours the night before the test, she's better off spreading 1 hour over 4 weeks instead.



Long delays between study periods are ideal but that requires strong EF skills (planning ahead and overcoming procrastination)

PODCAST RESOURCES



<http://www.fullprefrontal.com/podcast/episode-66/>

#4

CONTEXTUALIZE LEARNING



Help students connect individual experience to prior learning and the bigger picture of learning.

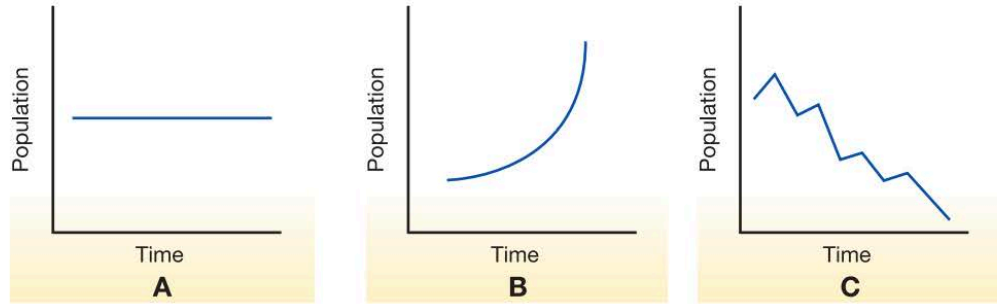


Deconstruct and Reconstruct learning:

3 Part Process:
Analyze, Outline &
Summarize

3.2 Section Review

1. What is a population? Give three examples of populations.
2. What three things does a population need to grow?
3. Which graph shows negative population growth?



4. What is the difference between a population and a community? Give two examples of communities.
5. A *remora* is a small fish that follows sharks around and eats their scraps. The shark does not benefit from the remora. This is an example of:
 - a. competition
 - b. predator-prey
 - c. parasitism
 - d. commensalism
6. Cans of tuna often carry warning labels. They state that pregnant women should limit the amount of tuna they eat each month.
 - a. Explain why tuna could contain dangerous toxins.
 - b. Draw a food chain showing how toxins could concentrate in the tissues of a tuna.

CHALLENGE

Find three real-life examples of each of the following interactions:

1. Competition
2. Predator-prey
3. Commensalism
4. Parasitism
5. Mutualism

Use encyclopedias and/or the Internet as resources.

SOLVE IT!

An ecologist studied the presence of a toxic chemical in a lake. She found that the water had one molecule of the toxin for every one billion molecules of water, or one part per billion (1 ppb). The algae had one part per million (1 ppm) of the toxin. Small animals, called zooplankton, had 10 ppm. Small fish had 100 ppm. Large fish had 1,000 ppm. How do you explain the increase in this toxin to 1,000 ppm for large fish? Use a drawing to help support your answer.

Example

8th Grade Science

3.2 Section Review

1. What is a population? Give three examples of populations.
2. What three things does a population need to grow?
3. Which graph shows negative population growth?

When we read the word
'population' what are we
talking about?

3.2 Section Review

1. What is a population? Give three examples of populations.
2. What three things does a population need to grow?
3. Which graph shows negative population growth?

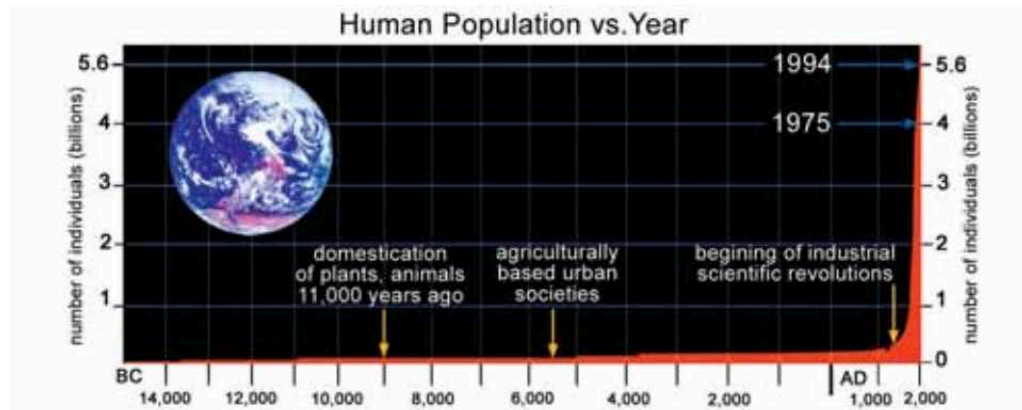
Guess the answer to the 2nd question:

“What three things does a population
need to grow?”

Populations

What is a population? A **population** is a group of individuals of the same species living in a given area. A population of clover plants in a tray consists of the total number of plants in that tray. A population of clover plants in a field consists of the total number of plants in that field (Figure 3.12).

Growth rate Populations change as old members die and new members are born. In nature, populations often stay about the same size from year to year. Other times, populations grow or decline very fast. The change in size of a population over time is called its **growth rate**. Growth rates can be positive, negative, or neutral. The graph below shows the growth rate of the human population. What can you tell about human population growth from this graph?



Limits to population growth In order to grow, a population needs energy, nutrients, and space. Energy and nutrients both come from food. Therefore, population growth is limited by the amount of food available. Population growth is also limited by space. Different organisms require different amounts of space in which to live. If any of these variables are too limited, a population will not continue to grow.



Figure 3.13: Two different populations of clover plants.

VOCABULARY

population - a group of individuals of the same species living in a given area.

growth rate - the change in size of a population over time.

8th Grade
Science:
Locate the
answer in
the text

PODCAST RESOURCES

A promotional graphic for Podcast Episode 7. It features an orange background with faint white line art of a microphone and a Wi-Fi symbol. A circular portrait of Bonnie Singer, Ph.D., is in the top right. The text reads: "Tune in to listen to", "PODCAST", "EPISODE 7:", "BONNIE SINGER, Ph.D.", "Write to Finish!", and the "Full PreFrontal with Sucheta Kamath" logo in the bottom right.

Tune in to listen to

PODCAST

EPISODE 7:

BONNIE SINGER, Ph.D.
Write to Finish!

Full
PreFrontal
with Sucheta Kamath

<http://www.fullprefrontal.com/podcast/episode-7/>

A promotional graphic for Podcast Episode 8. It features a dark purple background with faint white line art of a microphone and a Wi-Fi symbol. A circular portrait of Bonnie Singer, Ph.D., is in the top right. The text reads: "Tune in to listen to", "PODCAST", "EPISODE 8:", "BONNIE SINGER, Ph.D.", "The Right Way to Write", and the "Full PreFrontal with Sucheta Kamath" logo in the bottom right.

Tune in to listen to

PODCAST

EPISODE 8:

BONNIE SINGER, Ph.D.
The Right Way to Write

Full
PreFrontal
with Sucheta Kamath

<http://www.fullprefrontal.com/podcast/episode-8/>

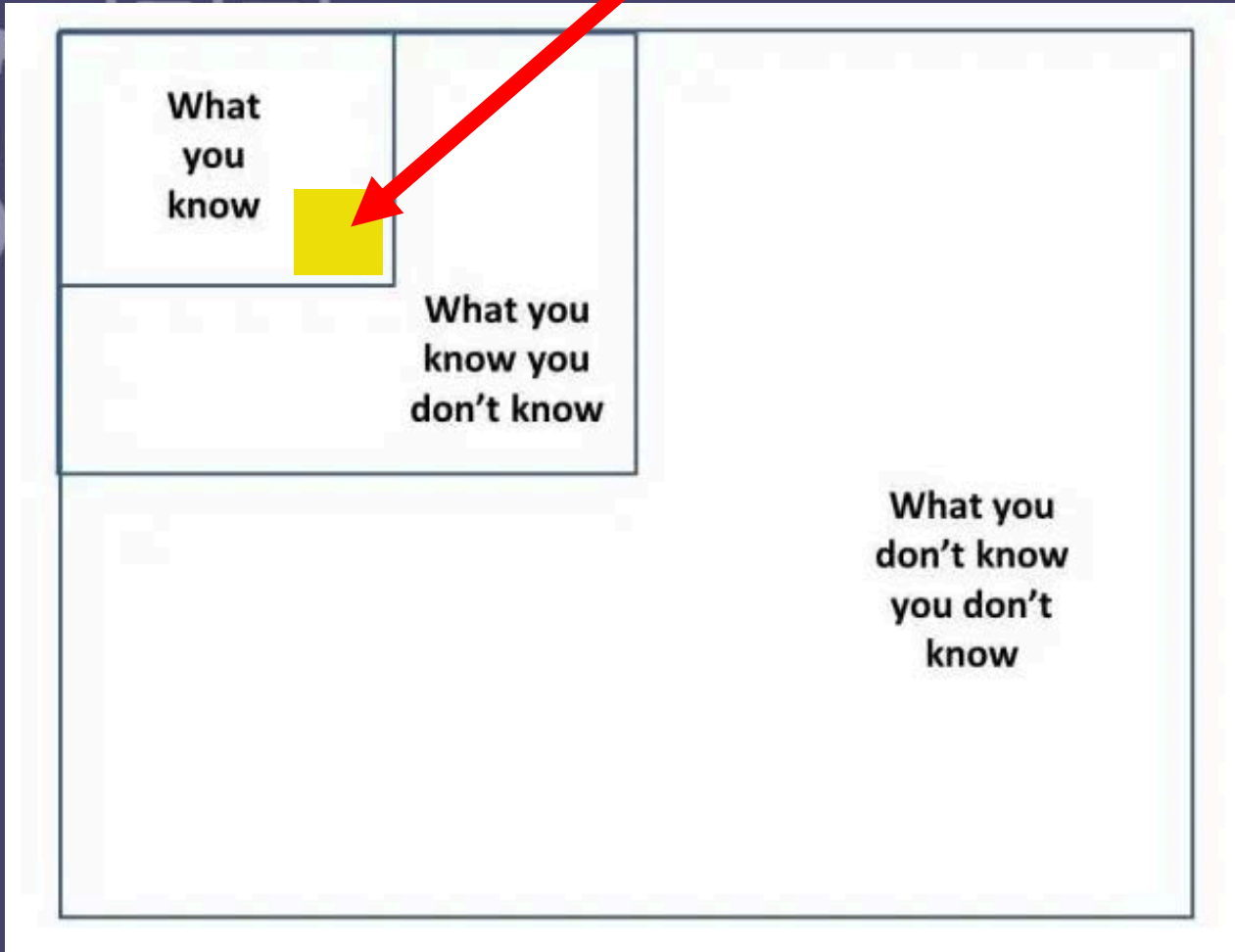
#5

META-COGNITION



Students clearly lack awareness of effective study strategies and need direct information from teachers

- Karpicke & Butler (2009)



Adapting “Four Boxes of Knowing” (Skip Walter) to teaching

- What you know
- What you know that you don't know
- What you don't know that you don't know



Make reading
(text or notes)
“Thinking Intensive”



Teach how to
dialogue with the
author (ask questions
in the margins)



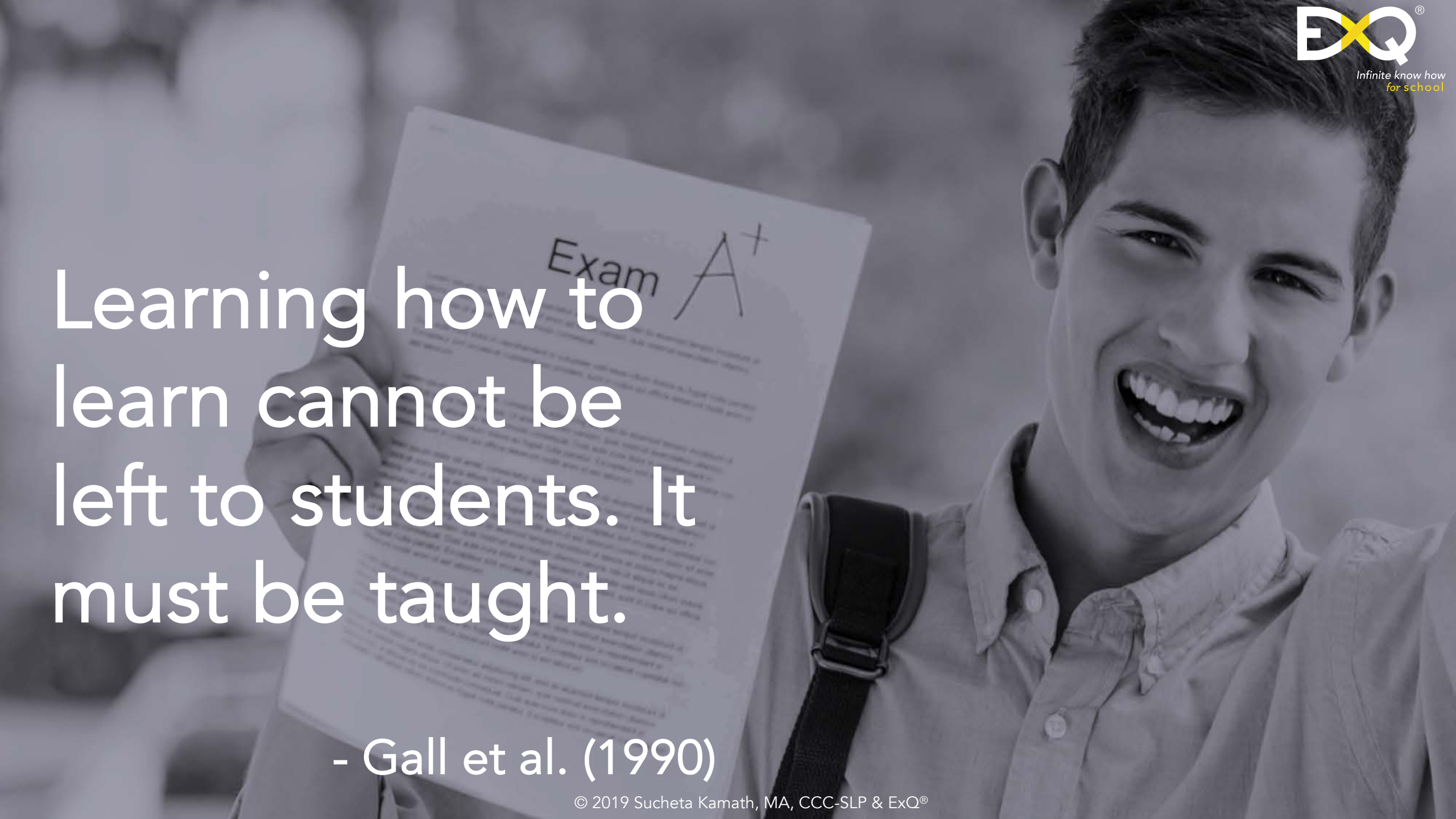


Self-Guided Questions:

1. Do I understand what I am learning?
2. How will I do if I am tested on this material?
3. Do I have a plan to succeed in this?
4. What parts were unclear or confusing?
5. How can I do better next time?

Executive Function

is figuring out the goals and
then directing effort and
attention towards the goals
in an adaptive way!

A young man with dark hair, wearing a light-colored button-down shirt and a black backpack strap, is smiling broadly while holding up a piece of paper. The paper has the word 'Exam' and a large 'A+' written on it. The background is a blurred outdoor setting.

Learning how to
learn cannot be
left to students. It
must be taught.

- Gall et al. (1990)

Thank You!

Sucheta Kamath,
Founder & CEO, ExQ[®]

Please don't forget
to complete the
survey at the end,
and suggest topics
for the next webinar!