SIX STRATEGIES FOR EFFECTIVE LEARNING

STRATEGIES FOR SUCCESSFUL STUDYING IN AN ONLINE LEARNING ENVIRONMENT

CONCRETE EXAMPLES

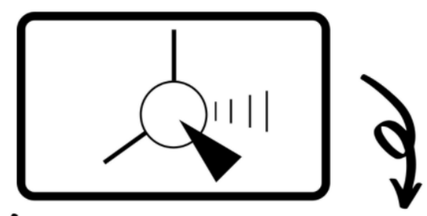
Cell Metabolism?

e.g. the powerhouse of the cell

i.e. the mitochondria!

Use specific examples to reinforce your understanding of abstract ideas

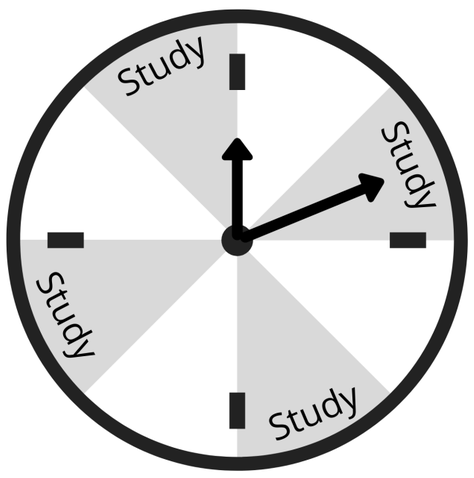
RETRIEVAL



Tetrahedral
- No lone pairs
- 4 groups
- sp3 orbital

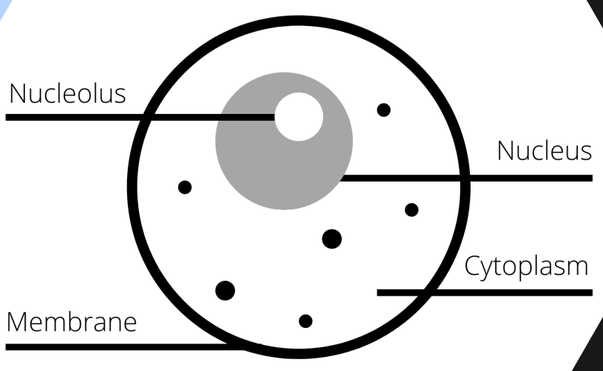
Practice bringing information to mind using different methods

SPACING



Space out your studying

DUAL CODING



Connect class topics to visuals

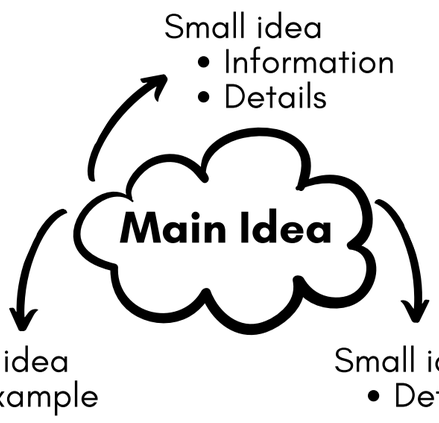
INTERLEAVING

To do:

- [x] CHEM 120 (30min)
- [x] PHYS 111 (30min)
- [ ] EARTH 121 (30min)
- [ ] CHEM 120 (30min)
- [ ] EARTH 121L (30min)

Switch between topics while you study

ELABORATION



Explain and describe ideas with many details

Derivative work, "Six Strategies for Effective Learning" from original by Yana Weinstein, Megan Smith, & Oliver Caviglioli. (n.d.). Six Strategies for Effective Learning. Retrieved from https://www.learningscientists.org/posters and licensed under CC BY-NC-ND 4.0. Cropped from original with permission. This derivative work is licensed under CC BY-NC-ND 4.0 by the University of Waterloo.

Created by R. Somera, H. Biram, D. Karunathilake, R. Kumar, K. Yang, & C. Zhu.

UNIVERSITY OF WATERLOO | FACULTY OF SCIENCE

STUDYING WITH INTERLEAVING

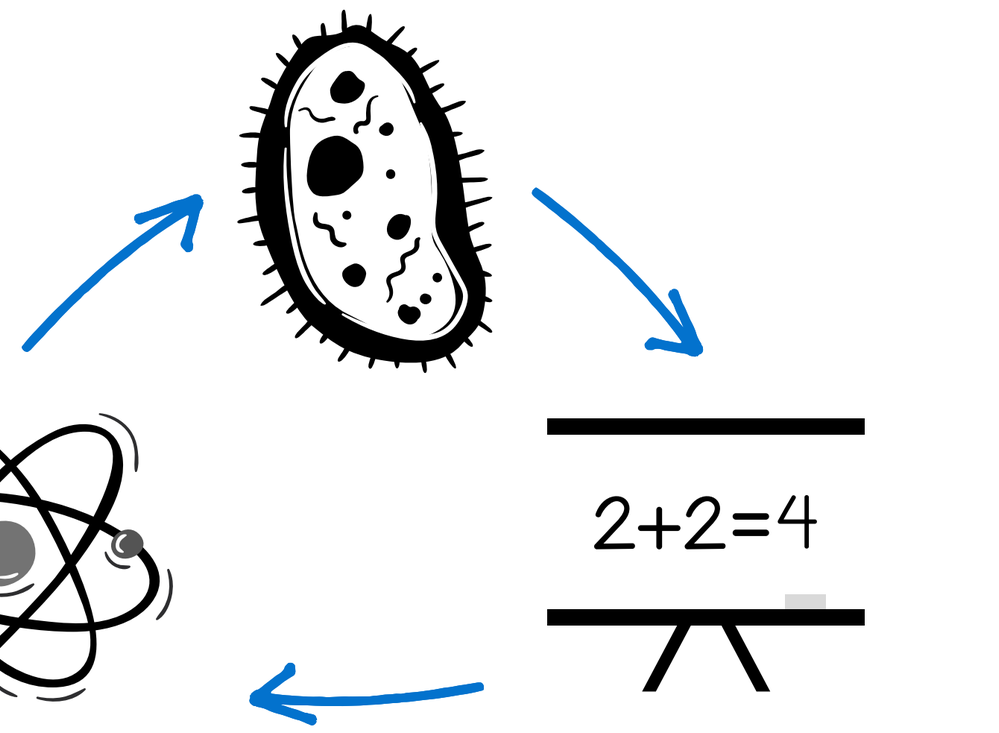
SWITCH BETWEEN TOPICS WHILE YOU STUDY

HOW TO DO IT

In one study session, switch topics. Don't stay on one idea!

The next time that you study this set of topics, go over them again in a different order.

Find connections between the different ideas/concepts as you switch between them.



AVOID

Switching between ideas too fast!

Understand a topic before you move on.

If the information is not sticking with you, take a short break from the screen, then try again.

Derivative work, “Six Strategies for Effective Learning” from original by Yana Weinstein, Megan Smith, & Oliver Caviglioli. (n.d.). Six Strategies for Effective Learning. Retrieved from https://www.learningscientists.org/posters and licensed under CC BY-NC-ND 4.0. Cropped from original with permission. This derivative work is licensed under CC BY-NC-ND 4.0 by the University of Waterloo.

Created by R. Somera, H. Biram, D. Karunathilake, R. Kumar, K. Yang, & C. Zhu.

UNIVERSITY OF WATERLOO | FACULTY OF SCIENCE

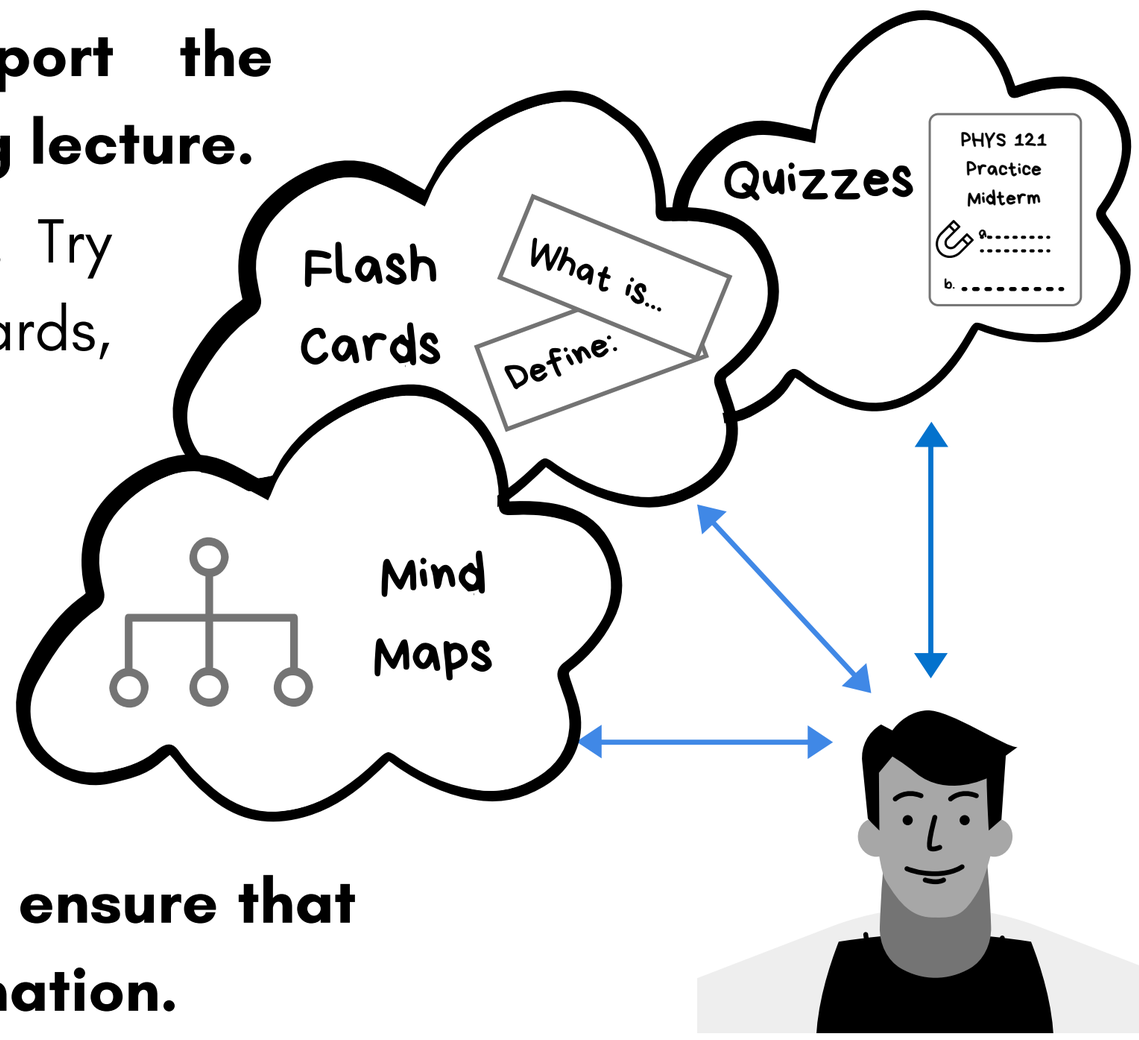
STUDYING WITH RETRIEVAL

PRACTICE BRINGING INFORMATION TO MIND USING DIFFERENT METHODS

HOW TO DO IT

Use different methods to support the information you have learned during lecture.

There are several ways to do this. Try creating mind maps, making flashcards, or writing practice quizzes that can be exchanged with classmates.

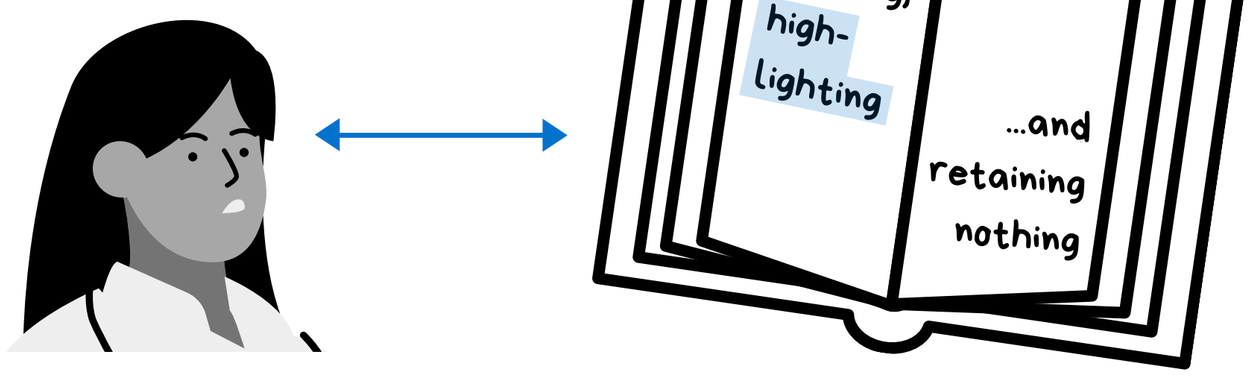


Always refer back to class notes to ensure that you are retrieving the correct information.

AVOID

Re-reading, highlighting, and repeatedly going over the same notes.

Retrieval methods can be challenging. However, they allow information to be retained in your long term memory.



Derivative work, “Six Strategies for Effective Learning” from original by Yana Weinstein, Megan Smith, & Oliver Caviglioli. (n.d.). Six Strategies for Effective Learning. Retrieved from https://www.learningscientists.org/posters and licensed under CC BY-NC-ND 4.0. Cropped from original with permission. This derivative work is licensed under CC BY-NC-ND 4.0 by the University of Waterloo.

Created by R. Somera, H. Biram, D. Karunathilake, R. Kumar, K. Yang, & C. Zhu.

UNIVERSITY OF WATERLOO | FACULTY OF SCIENCE

3

STUDYING WITH

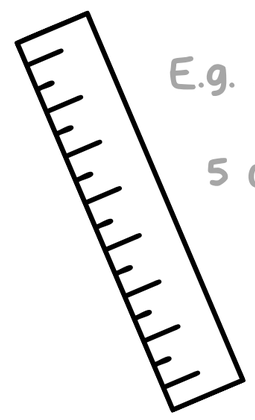
CONCRETE EXAMPLES

USE SPECIFIC EXAMPLES TO REINFORCE YOUR UNDERSTANDING OF ABSTRACT IDEAS

HOW TO DO IT

Identify the concept that re-appears in course examples.

Make connections between this main concept that you are studying and each example.



E.g. 1 - length conversions

$$5\ \text{cm} \times \frac{1\ \text{m}}{100\ \text{cm}} = 0.05\ \text{m}$$

as 1 m = 100 cm

E.g. 2 - mass conversions

$$10\ \text{g} \times \frac{1\ \text{kg}}{1000\ \text{g}} = 0.01\ \text{kg}$$

as 1 kg = 1000 g

Ask yourself...

- Why is this example relevant?
- What theories or principles are used here?

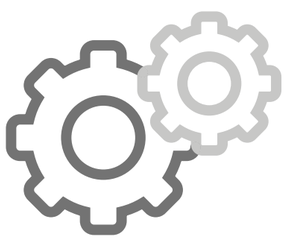
Principle = unit conversion

$$\text{starting unit} \times \frac{\text{desired unit}}{\text{starting unit}} = \text{desired unit}$$

AVOID

Memorizing every detail for each example.

Learn how the examples used in class actually apply to the main principle.



~~g → kg : multiply by 1000~~

~~kg → g : divide by 1000~~

Derivative work, "Six Strategies for Effective Learning" from original by Yana Weinstein, Megan Smith, & Oliver Caviglioli. (n.d.). Six Strategies for Effective Learning. Retrieved from https://www.learningscientists.org/posters and licensed under CC BY-NC-ND 4.0. Cropped from original with permission. This derivative work is licensed under CC BY-NC-ND 4.0 by the University of Waterloo.

Created by R. Somera, H. Biram, D. Karunathilake, R. Kumar, K. Yang, & C. Zhu.

UNIVERSITY OF WATERLOO | FACULTY OF SCIENCE

STUDYING WITH SPACING

SPACE OUT YOUR STUDYING OVER TIME

HOW TO DO IT

Review information from each class, but not immediately after class.

Schedule study sessions ahead of time and stick to it. This helps you manage your time for all of your classes.

PHYS 124 Study Schedule

DAY 1	DAY 2	DAY 3	DAY 4
Study 15 min		Study 20 min	

DAY 5	DAY 6	DAY 7	DAY 8
Study 30 min		Review 1 hour	Final 9:00 am

Always return to relevant, older information to help keep it fresh in your mind too.

AVOID

Cramming info in all at once.

You will not be able to retain any information if you force yourself to learn it all in a short period of time.

Go through little bits over time. It will add up!

DAY 1	DAY 2
Cram all day	Final 9:00 am

Derivative work, “Six Strategies for Effective Learning” from original by Yana Weinstein, Megan Smith, & Oliver Caviglioli. (n.d.). Six Strategies for Effective Learning. Retrieved from https://www.learningscientists.org/posters and licensed under CC BY-NC-ND 4.0. Cropped from original with permission. This derivative work is licensed under CC BY-NC-ND 4.0 by the University of Waterloo.

Created by R. Somera, H. Biram, D. Karunathilake, R. Kumar, K. Yang, & C. Zhu.

UNIVERSITY OF WATERLOO | FACULTY OF SCIENCE

5

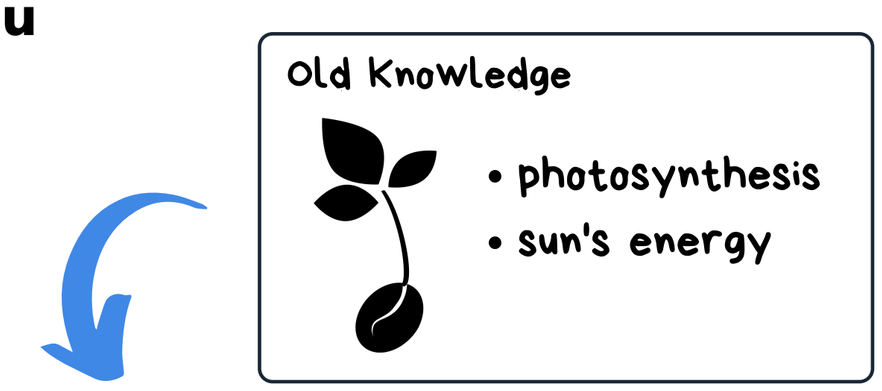
STUDYING WITH ELABORATION

EXPLAIN AND DESCRIBE IDEAS WITH DETAILS

HOW TO DO IT

Make connections within the material that you are learning to solidify your understanding.

While attempting to learn new information, make connections with previously known ideas or experiences.



Ask yourself..

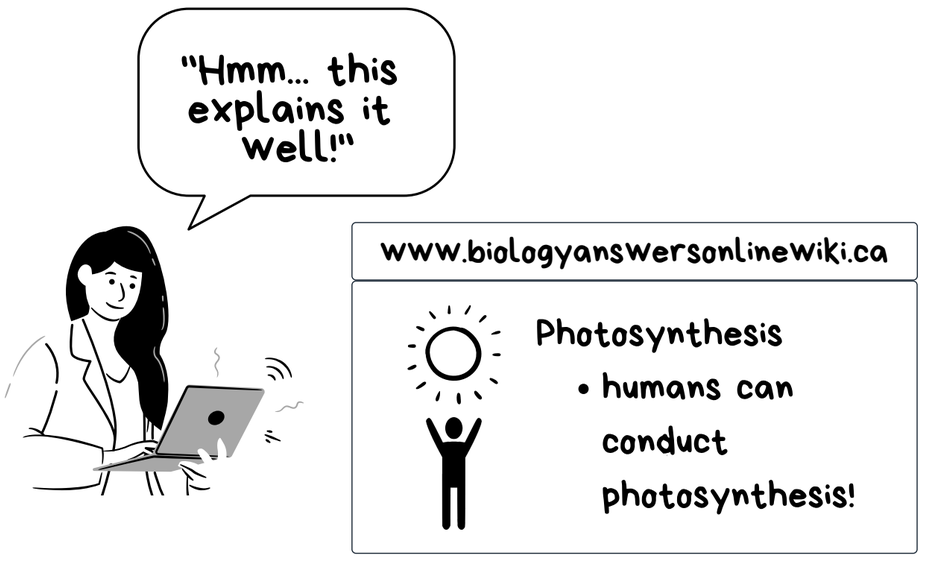
- How do they work together?
- How are they similar or different?

Discuss answers with classmates.

AVOID

Assuming information and making false connections.

Make sure to double check with your course notes to ensure that the connections that you are making are accurate.



Derivative work, "Six Strategies for Effective Learning" from original by Yana Weinstein, Megan Smith, & Oliver Caviglioli. (n.d.). Six Strategies for Effective Learning. Retrieved from https://www.learningscientists.org/posters and licensed under CC BY-NC-ND 4.0. Cropped from original with permission. This derivative work is licensed under CC BY-NC-ND 4.0 by the University of Waterloo.

Created by R. Somera, H. Biram, D. Karunathilake, R. Kumar, K. Yang, & C. Zhu.

UNIVERSITY OF WATERLOO | FACULTY OF SCIENCE

STUDYING WITH

DUAL CODING

CONNECT CLASS TOPICS TO VISUALS

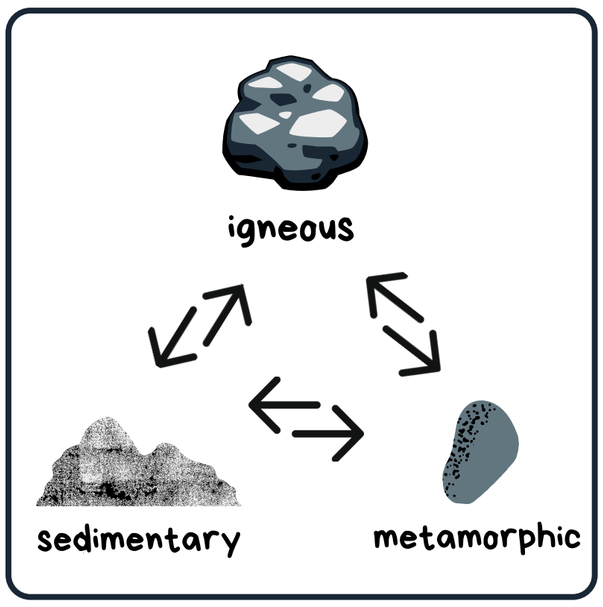
HOW TO DO IT

Look at class materials and create suitable visuals to describe what you are learning.

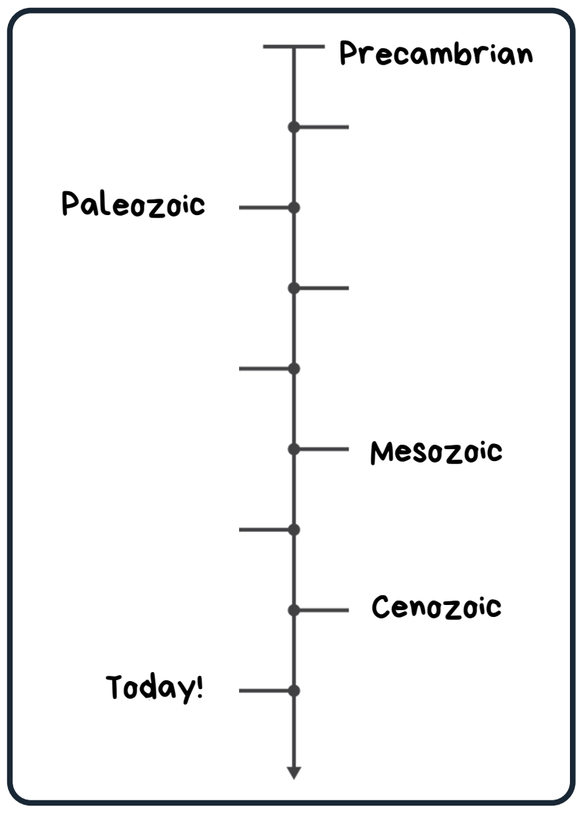
Visuals can include infographics, timelines, cartoon strips, diagrams, graphic organizers, and more.

Afterwards, take a look at your visuals, and explain in your own words what they mean.

Diagram



Timeline

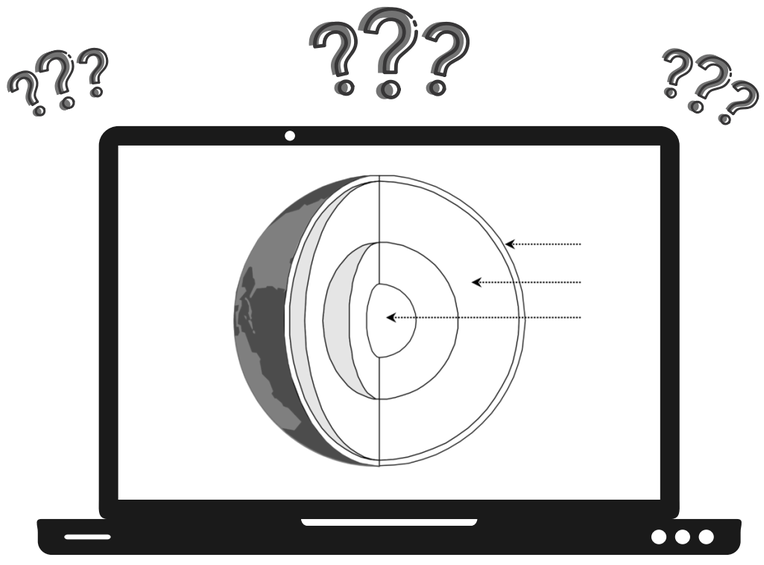


AVOID

Relying solely on another's visual from the Internet.

Visualize it in a way that works for you.

Otherwise, you may have trouble explaining it!



Derivative work, “Six Strategies for Effective Learning” from original by Yana Weinstein, Megan Smith, & Oliver Caviglioli. (n.d.). Six Strategies for Effective Learning. Retrieved from https://www.learningscientists.org/posters and licensed under CC BY-NC-ND 4.0. Cropped from original with permission. This derivative work is licensed under CC BY-NC-ND 4.0 by the University of Waterloo.

Created by R. Somera, H. Biram, D. Karunathilake, R. Kumar, K. Yang, & C. Zhu.

UNIVERSITY OF WATERLOO | FACULTY OF SCIENCE