



Flipped Classroom Design: Increasing Engagement and Student Success

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Flipped Classroom Design



Flipping the classroom: Student-Centered Pedagogy

Flipped classroom is a “pedagogical approach in which direct instruction moves from the group learning space to the individual learning space, and the resulting group space is transformed into a dynamic, interactive learning environment where the educator guides students as they apply concepts and engage creatively in the subject matter” (The Flipped Learning Network, 2014)

<https://www.youtube.com/watch?v=r2b7GeuqkPc>



HOW TO IMPLEMENT A FLIPPED CLASSROOM?



Jeff Dunn (2014) has wrote a short piece on “The 6-step guide to flipping your classroom”, which presented 6 easy steps for implementing flipped classroom.

1. **Plan.** Figure out which lesson in particular you want to flip. Outline the key learning outcomes and a lesson plan.
2. **Record or Seek.** Instead of teaching this lesson in-person, make a video. A screencast works. Make sure it contains all the key elements you'd mention in the classroom. In Bergmann and Sams' book (2012), they also pointed out that do not make a video just for the sake of making a video. Only do so when you feel these are appropriate and necessary. It all depends on the educational goal of your lesson. If making videos better facilitate your instructional goal, then go ahead.
3. **Share or Advise.** Send the video to your students. Make it engaging and clear. Explain that the video's content will be fully discussed in class.
4. **Group.** An effective way to discuss the topic is to separate into groups where students are given a task to perform. Write a poem, a play, make a video, etc.
5. **Regroup.** Get the class back together to share the individual group's work with everyone. Ask questions, dive deeper than ever before.
6. **After the completing the steps, Review, Revise, and Repeat!**

HOW TO IMPLEMENT A FLIPPED CLASSROOM?



Some other strategies that can be used in in-class activities include:

- *Active learning.* Allow students to apply concepts in class where they can ask peers or instructors for feedback and clarification.
- *Peer instruction.* Students can teach each other by explaining concepts or working on small problems.
- *Collaborative learning.* Collaborative learning activities could increase student engagement, enhance student understanding, and promote collective intelligence.



Examples of YouTube Video in Chemistry



- <https://www.youtube.com/watch?v=A8TPTaOkr7s>
- <https://www.youtube.com/watch?v=ZOD05QBe-XE&list=PLSd2cwTMhAHHHeadzS13ucabMWNKcPABho&index=11&t=172s>
- https://www.youtube.com/watch?v=NDcIPS5FfZk&list=PLSd2cwTMhAHH_qH0_XvORtXni0SRkcMI-&index=2
- https://www.youtube.com/watch?v=so77EnfTOvg&list=PLSd2cwTMhAHH_qH0_XvORtXni0SRkcMI-&index=1
- <https://www.youtube.com/watch?v=ge8ThB6zNis&list=PLSd2cwTMhAHHzLrWJknCNoDD3bSHWleWT&index=4>
- https://www.youtube.com/watch?v=_28Q6MfwjYU&list=PLSd2cwTMhAHGwVKiJynftuajFgQpEcNbG&index=5&t=0s
- <https://www.youtube.com/watch?v=P-WL2qupv84>



Assessment (Grading)



- Peer-Grading: 25% of the grade.
- Assignment is worth 150 pts
 - 50 pts for Background work submitted a week before the videos are due
 - 25 pts for Creative
 - 25 pts for Mastery of Content
 - 25 pts for Clarity
 - 25 pts for Delivery

Oral Exam

- **How:**

- Need a small class 25 or less
- Develop open-ended questions
- Each student gets two questions
 - Allow students to pick one topic
 - You pick a topic
- **Assess:**
 - If they can answer it on their own:
full points
 - If they need help from the class:
half points

- **Benefits**

- Test students ability to effectively communicate concepts learned in the classroom
- Prevents cheating
- Engages the entire class
- Motivate students



Effectively Completing Metacognitive Reflections

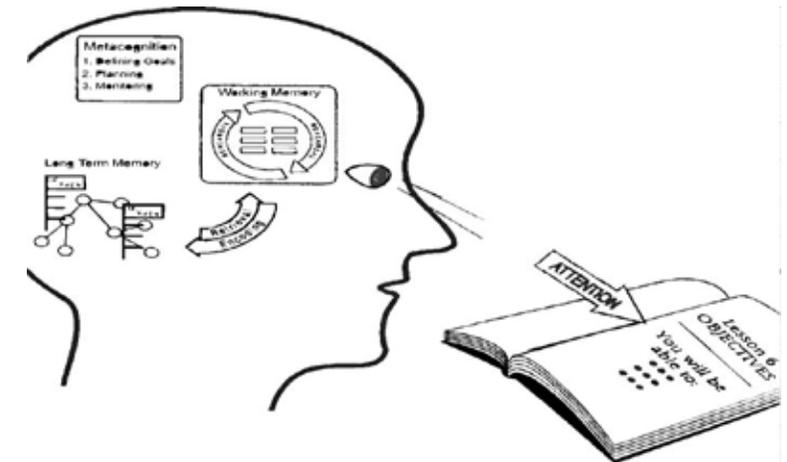
Metacognitive Reflections



What is Metacognition?

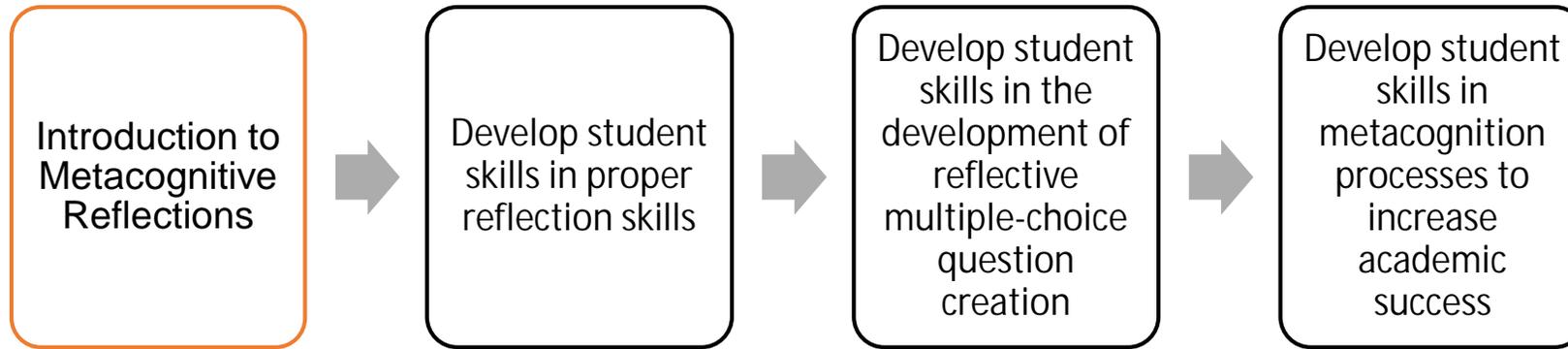
It is put simply, thinking about one's thinking. More precisely, it refers to the processes used to plan, monitor, and assess one's understanding and performance.

Metacognition includes a critical awareness of one's thinking and learning



Student learning requires effortful and reflective information processing with the ultimate goal of understanding

Big Picture

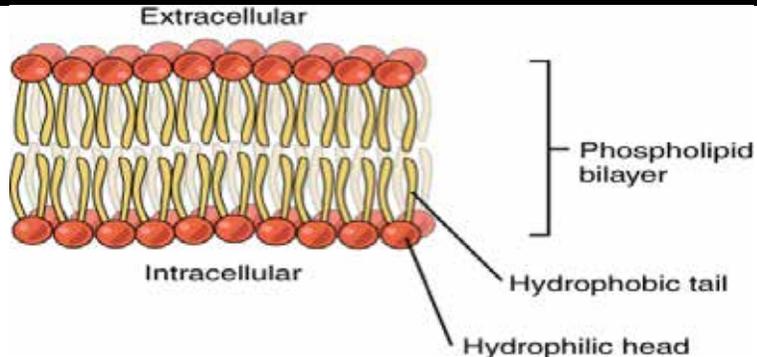


- Infusion of visualization and reflection to increase content understanding.

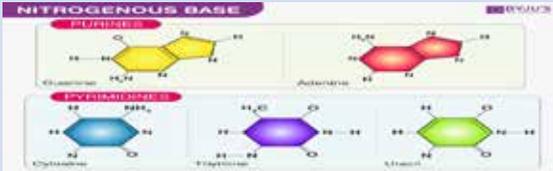
Metacognitive Reflection: Prompt Instructions

Prompts	Response
Identify section of the article you desire to learn. Write down the title of the section in the article	<i>In the article, video or website, what section will you be choosing to complete your reflection. If there are no sections, identify the name of the article</i>
Before reading, ask yourself “What do I already know about this topic that could guide my learning?” (Write down your answer).	<i>Just reading the name of the chapter and concept section, do you already know something about this topic? If not, say “This topic is new for me”.</i>
As you read, ask yourself and provide answers to the following question: What is the most challenging for me about this section of the	<i>List any areas, words, phrases that were difficult for you to understand.</i>
“I learned a lot in doing this assignment”. To what extent do you agree or disagree with this statement.	<i>Choose agree or disagree and explain why.</i>
Insert a diagram that is relevant the section. The diagram can be constructed or obtained from a website.	<i>Find a picture online that appropriately illustrates what you read</i>
Internet Link to the Diagram	<i>List the full link to where you found your picture.</i>

Metacognitive Reflection Prompt: Completed

Prompts	Response
Identify section of the article you desire to learn. Write down the title of the section in the article	5.1 Biological Membranes Have a Common Structure and Are Fluid: Lipids form the hydrophobic core of the membrane.
Before reading, ask yourself “What do I already know about this topic that could guide my learning? (Write down your answer).	I already knew that membranes are made of a hydrophilic head and hydrophobic tail, in two layers back to back so that the inside of the membrane is hydrophobic, ensuring that it does not dissolve in water or associate with other hydrophilic substances, enabling the membrane to do its job, which is to keep components of a cell separate from its outside surroundings and environment
As you read, ask yourself and provide answers to the following question: What is the most challenging for me about this section of the article?	The most challenging part of this section is understanding that longer chain fatty acids result in less fluidity, but this is because they are saturated and are densely packed together, resulting in less fluid and allowing for little movement. Unsaturated fatty acids are more fluid because their molecules are packed more loosely.
As you read, ask yourself and provide answers to the following question: What is most confusing?	The most confusing part of this section was how the hydrophilic, polar head of the phospholipid could interact with water, because I was thinking that it should dissolve- then I realized and remembered that hydrophilic means water friendly, so it doesn't necessarily have to dissolve to be able to interact with water!
“I learned a lot in doing this assignment”. To what extent do you agree or disagree with this statement.	I did not learn too much. I knew the main idea about the phospholipid bilayer and the hydrophilic head and hydrophobic tail- the rest of this section was simple information about size and what has an effect on the fluidity of fatty acids.
Insert a diagram that is relevant the section. The diagram can be constructed or obtained from a website.	 <p>The diagram illustrates a cross-section of a phospholipid bilayer. It consists of two opposing layers of phospholipids. Each phospholipid molecule has a red, spherical hydrophilic head and two yellow, wavy hydrophobic tails. The heads of the outer layer face the 'Extracellular' space, while the heads of the inner layer face the 'Intracellular' space. The tails of both layers point toward each other, forming a hydrophobic core. A bracket on the right side labels the entire structure as the 'Phospholipid bilayer'. Labels with leader lines point to a 'Hydrophilic head' and a 'Hydrophobic tail'.</p>
Internet Link to the Diagram	http://blog.cambridgecoaching.com/what-is-the-phospholipid-bilayer-and-what-determines-its-fluidity

Metacognitive Reflection Prompt: Completed

Prompts	Response
Identify section of the article you desire to learn. Write down the title of the section in the article	Concept 9.1: Chemical Composition (Purines and Pyrimidines)
Before reading, ask yourself "What do I already know about this topic that could guide my learning? (Write down your answer).	Purines and Pyrimidines are all composed of nucleotides, that are apart of our DNA. I know the sequence of DNA/RNA which is ATCG from previous chapters. A=Adenine, T=Thymine, C=Cytosine, G=Guanine.
As you read, ask yourself and provide answers to the following question: What is the most challenging for me about this section of the article?	The most challenging for me is deciphering what is a Purine and Pyrimidine. The pneumonic helps, but I want to learn how to put them in order based on their label. After studying, <u>Purines</u> are Adenine (A) and Guanine (G), because they both can't be compared with C and T, which are our Pyrimidines!
As you read, ask yourself and provide answers to the following question: What is most confusing?	The most confusing part of this chapter is grasping all the information I know already and putting it into context. Some terms have different meaning with different pairings (DNA/RNA). With consistent studying, I'll have this under my belt!
"I learned a lot in doing this assignment". To what extent do you agree or disagree with this statement.	I definitely learn a lot while doing assignments like this, because I'm answering my own questions. I'm un-confusing myself!
Insert a diagram that is relevant the section. The diagram can be constructed or obtained from a website.	 <p>The diagram illustrates the chemical structures of nitrogenous bases. It is divided into two main sections: Purines and Pyrimidines. Under Purines, Adenine (a yellow double-ring structure) and Guanine (a green double-ring structure) are shown. Under Pyrimidines, Cytosine (a blue single-ring structure), Thymine (a purple single-ring structure), and Uracil (a green single-ring structure) are shown. Each structure is labeled with its name and color-coded to match the text labels.</p>
Internet Link to the Diagram	https://byjus.com/biology/nucleic-acid-genetic-code/

Metacognition (Reflection): Creation of Multiple Choice Questions

Q_N	T1	TEXT	T2
1	Q1	The cell membrane's key characteristic is that it allows cells to maintain a stable environment by allowing certain materials in while not allowing others into the cell. This is known as being:	Q
1	A1	Facilitated transport	AI
1	B1	Selectively permeable	AC
1	C1	Passive communication	AI
1	D1	Cell communication	AI
1	E1	<p>Explain why B1 is the correct answer using information from that section of the textbook.</p> <p>Example: Semi-permeability is a vital function of the cell membrane as it guards and protects the cell from outside intruders along with allowing necessary molecules in while allowing waste products out. This keeps the cell in homeostasis.</p>	E (Explanation of Answer)
2	Q2		Q
2	A2		
2	B2		
2	C2		
2	D2		
2	E2		E
3	Q3		Q
3	A3		

Online Learning Initiative Tutorial

Module 1 / Metacognitive Reflection Completion

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LEARNING OBJECTIVES

Students will be able to describe metacognition

Students will be able to effectively complete page number one of a metacognitive reflection

Students will be able to effectively create multiple choice questions for page number 2 of a metacognitive reflection

Students will be able to identify and review correct samples of correctly completed metacognitive reflections

Welcome to OLI Metacognition Reflection Tutorial	2
Page One Reflection Instructions	3
Page One Reflection Instructions: Part II	4
Page Two Multiple Choice Creation Reflection Instructions	5
Completed Metacognition Overview	6

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It is put simply, thinking about one's thinking. More precisely, it refers to the processes used to plan, monitor, and assess one's understanding and performance. Metacognition includes a critical awareness of a) one's thinking and learning and b) oneself as a thinker and learner.

Which of the following best describes the term metacognition?



- A lecture and note taking form of learning only*
- Refers to the processes used to plan, monitor, and assess one's understanding and performance*
- Helping students memorize information*

Students often know they should think but understanding "HOW" one thinks can allow students greater academic success

[Reset this Activity](#)

Learn By Doing and Did I Get This Activities:

- Development of metacognition skills should not be limited to certain learning areas and students are given opportunities to test knowledge while learning and receiving immediate feedback to decrease time in error state.

Course Alignment:

Learning Objectives Descriptions of what students should be able to do by the end of an instructional unit.	Assessments Tasks that provide feedback on students' knowledge and skills.	Instructional Activities Contexts and activities that foster students' active engagement.
<p>Students will be able to correctly complete metacognitive reflection activity in Principles of Biology course</p>	<p>Formative: Pretest, Learn By Doing, Did I Get This</p> <p>Summative: End of Module Quizzes, Posttest</p>	<p>Students will complete OLI tutorial that will foster learning the proper form and function of metacognitive reflections.</p> <p>This will allow students to learn about their individual learning styles and improved Biology content processing.</p>



Thank you for coming today and
feel free to contact us with any
question.

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