

Creative and Scientific Thinking

Prepared by Prof. Shereen Taie

CRE252

Information Technology Department

Lecture 4





مجموعة جامعة
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Creative and Scientific Thinking

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www.midocean.ae

Learning Objectives:

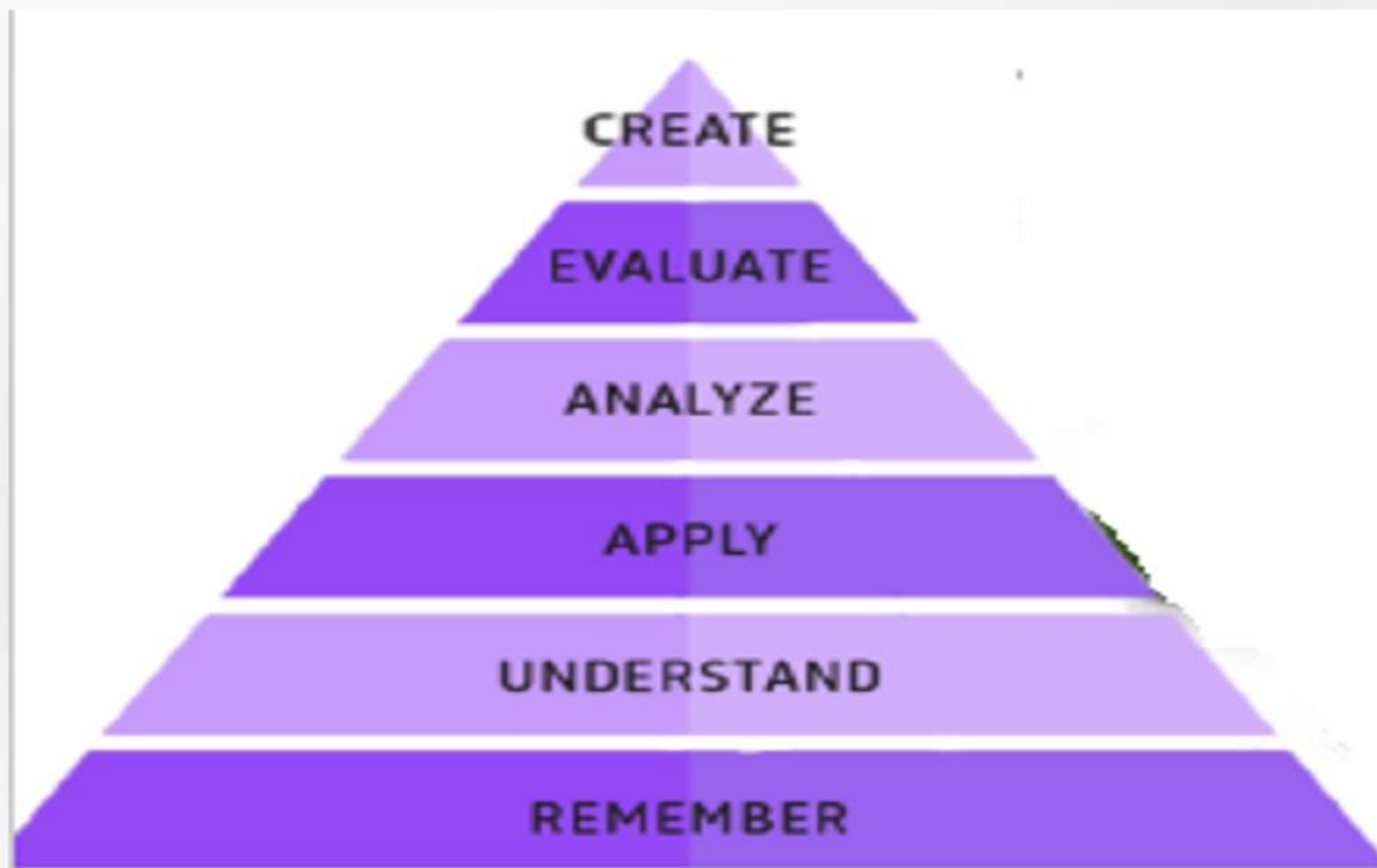
- Bloom`s Taxonomy
- Bloom`s Taxonomy Levels
- Bloom`s Taxonomy Examples
- Bloom`s Taxonomy Definition
- Levels of thinking: Bloom Taxonomy
- Low level of thinking
- High level of thinking
- Using Bloom`s Taxonomy in Designing a Course
- Components of Scientific Thinking

Bloom`s Taxonomy

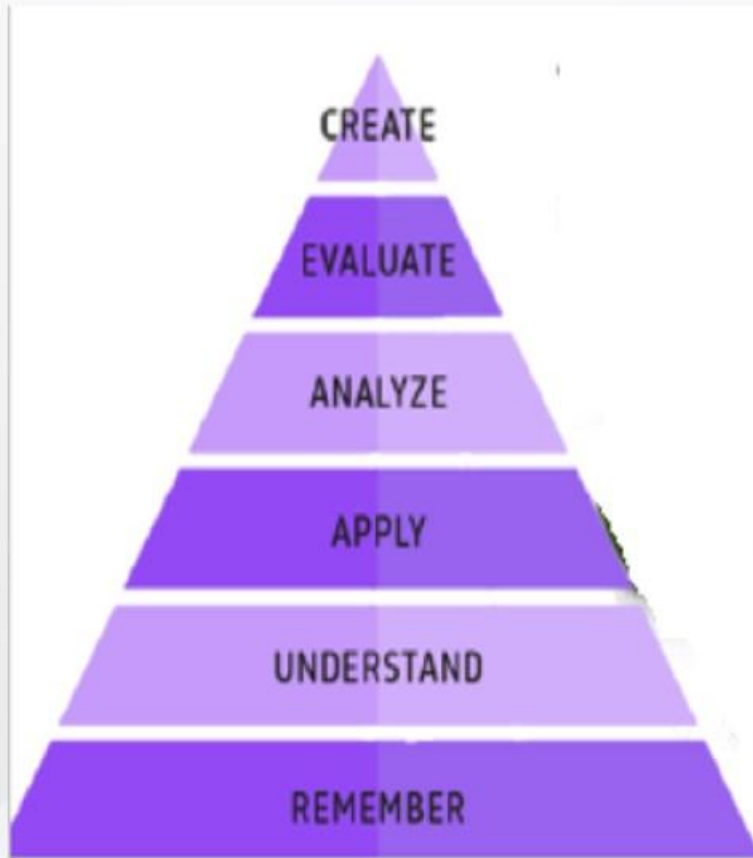
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Bloom's Taxonomy Levels:



Example 1:



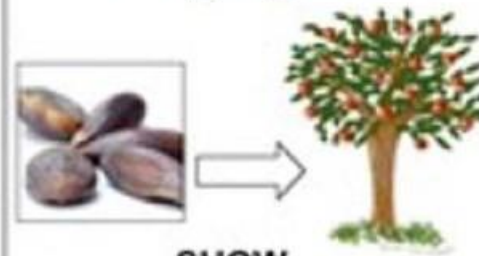
Bloom's Taxonomy

1 **Remember**
What is an apple



KNOW

2 **Understand**: Do you understand how an apple grows?



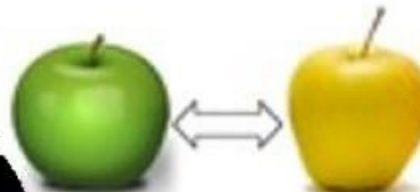
SHOW

3 **Apply**: Can you use apple?



DO

4 **Analyze**: Can you compare apples?



COMPARE

5 **Evaluate**: what is the best type of apples?



JUDGE

6 **Create**: Can you invent a new type of apple Sause?



CREATE

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Bloom's Taxonomy Definition



Bloom`s Taxonomy Definition:

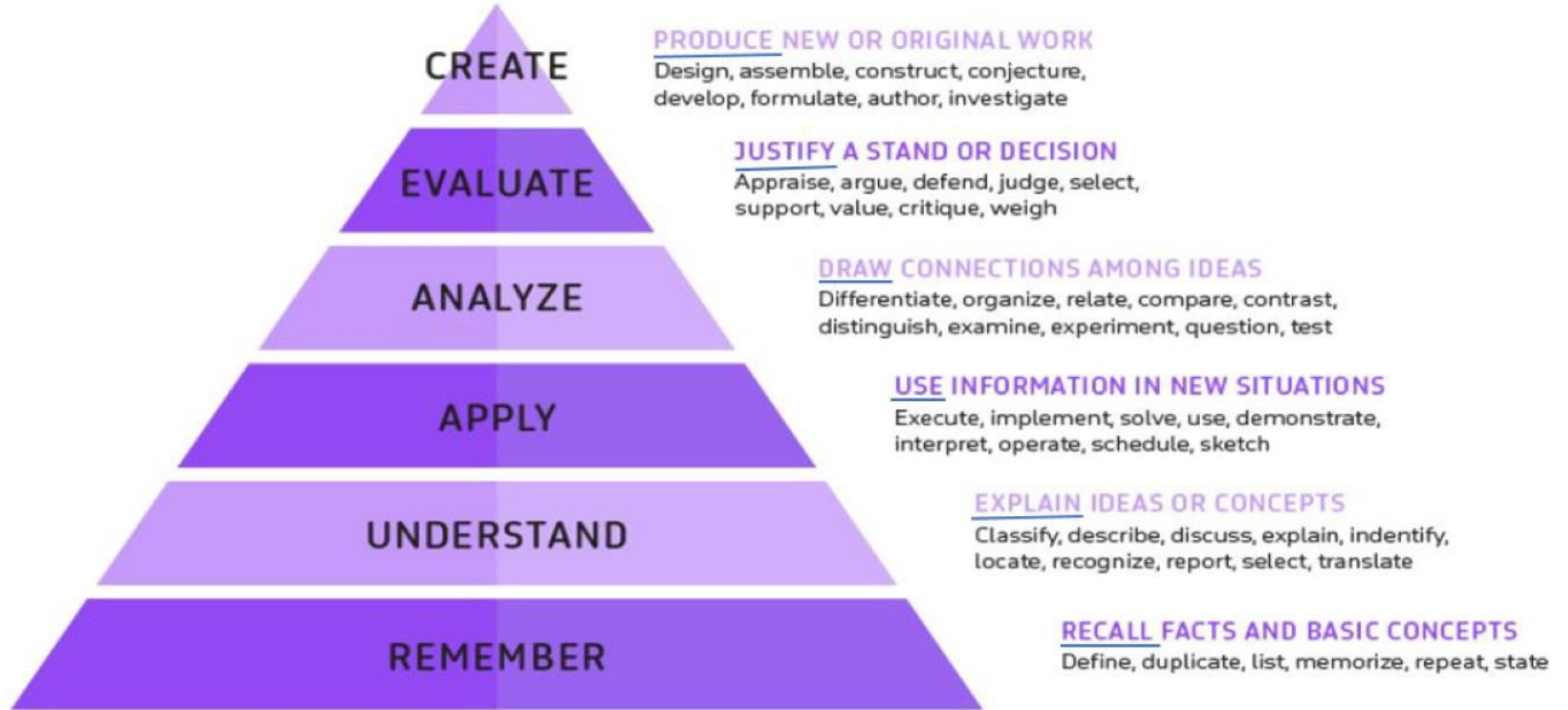
- **Bloom`s taxonomy** is a **framework** for **educational** achievement in which each level depends on the one of the following:
 - **Create**
 - **Evaluate**
 - **Analyze**
 - **Apply**
 - **Understand**
 - **Remember**

Bloom's Taxonomy:



BLOOM'S TAXONOMY

Levels of thinking: Bloom Taxonomy



Levels of thinking: Bloom Taxonomy Definition

- Levels of thinking using Bloom Taxonomy is a method to categorize the brain thinking as six level.

Levels of thinking: Bloom Taxonomy

- The levels of thinking using Bloom Taxonomy are organized into two groups.

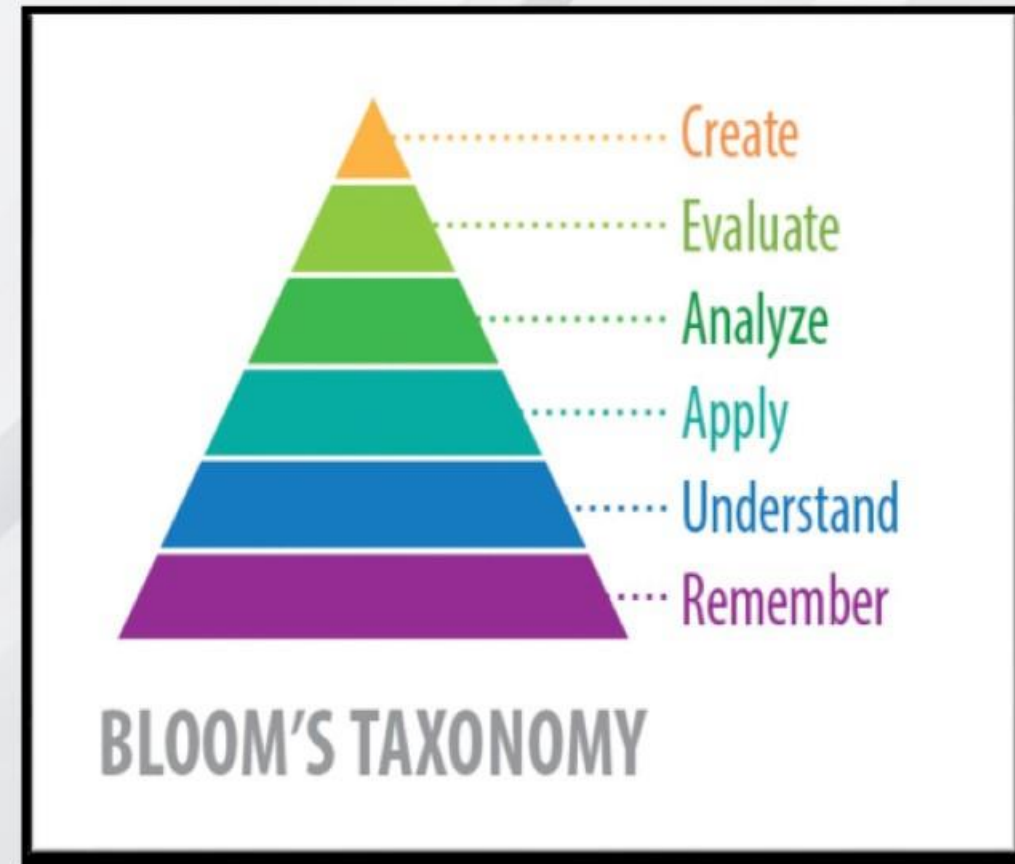
A. Low level of thinking

B. High level of thinking

Levels of thinking: Bloom Taxonomy

A. Low level of thinking: includes

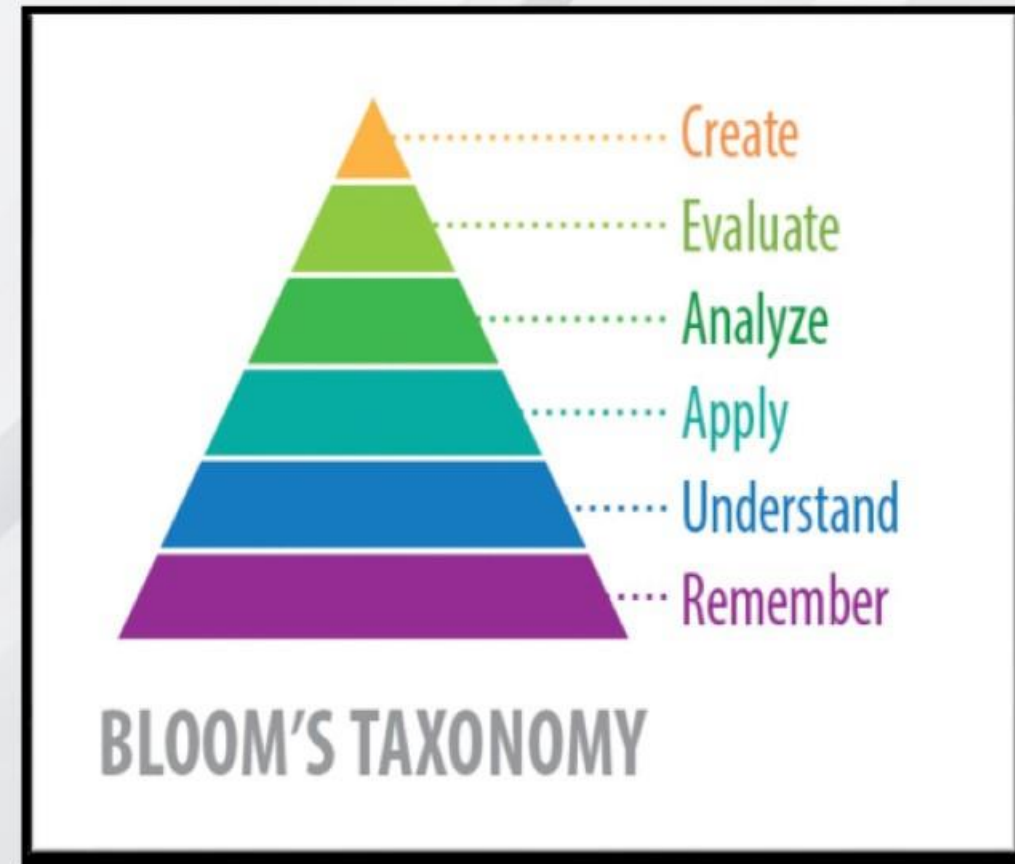
1. Remember
2. Understand
3. Apply



Levels of thinking: Bloom Taxonomy

B. High level of thinking: includes

4. Analysis
5. Evaluate
6. Create



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The Six Levels of thinking: Bloom taxonomy



Bloom`s Taxonomy

Low level of thinking

Level 1 of thinking: Bloom taxonomy

Remember:

- Is about **recalling facts and concepts**.
- A student can define and duplicate, make a list, memorize points, repeat information, and make valid statements.
- It **does not prove understanding**.



Level 2 of thinking: Bloom taxonomy

Understand:

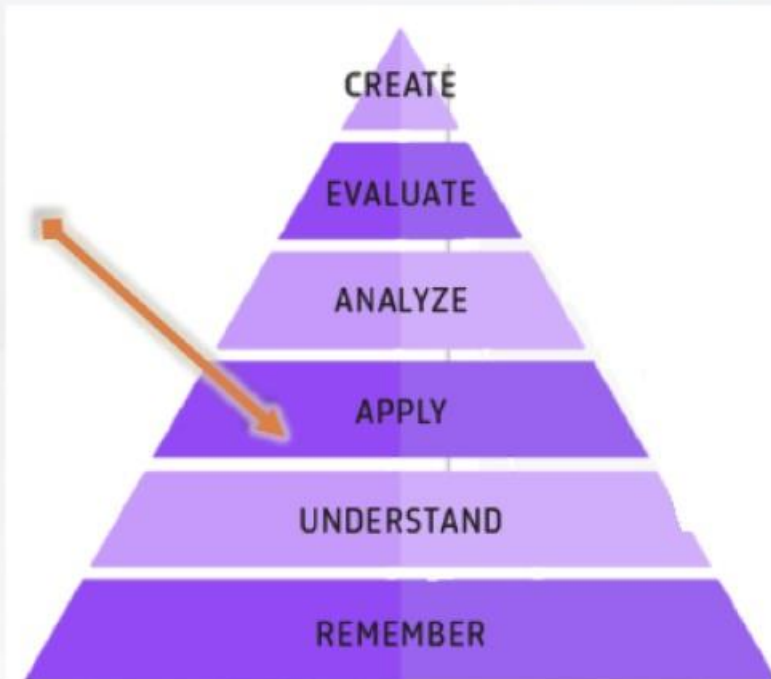
- This is where **the student understand**.
- The student explains ideas, explains what they mean and translates the facts in some way.



Level 3 of thinking: Bloom taxonomy

Apply:

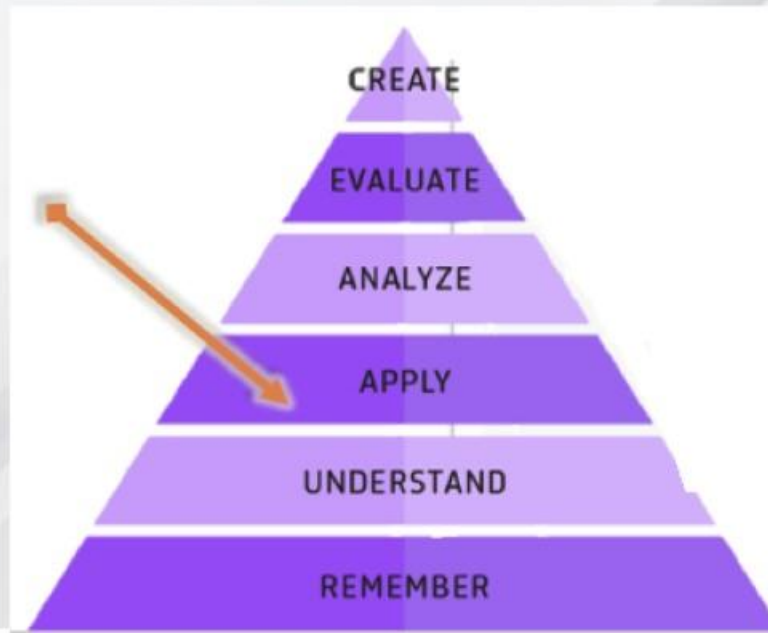
- In this level, students use the information.
- They have learned in new situations, whether it's to solve a problem, demonstrate an idea.



Level 3 of thinking: Bloom taxonomy

Apply:

- In **Apply** level of thinking using Bloom Taxonomy:
 - Be able to use / apply knowledge – to solve problems in new situations.
 - Example: How would you use what you know to detect a flaw in the structure?



Bloom`s Taxonomy

High level of thinking

Level 4 of thinking: Bloom taxonomy

Analyze:

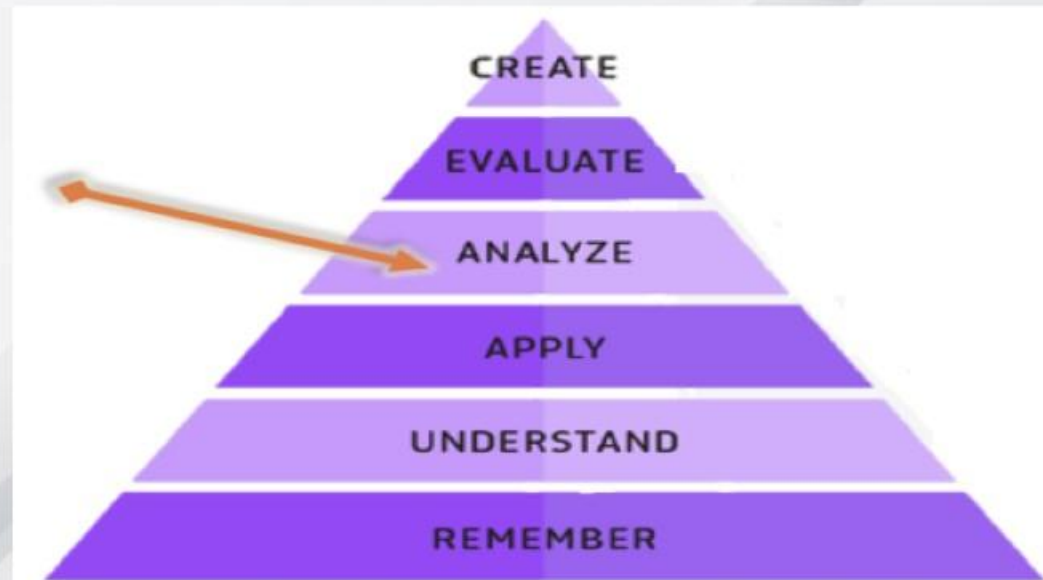
- The students must draw connections between ideas in the analyze level of Bloom's taxonomy.
- In the analyze level of Bloom's taxonomy, they must examine, question or test their knowledge.



Level 4 of thinking: Bloom taxonomy

Analyze:

- Critical thinking finally comes into play, as the student distinguishes between fact and opinion, and breaks information down into component parts.



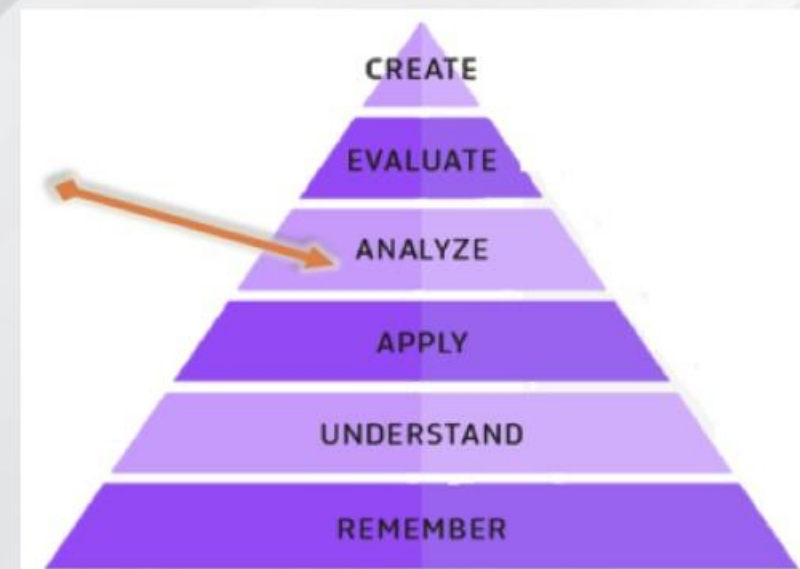
Level 4 of thinking: Bloom taxonomy

Analyze:

- In **Analyze** level of thinking using Bloom Taxonomy:

Be able to:

- Break up any new information to parts (Identify Reasons, Causes, Motives. etc...)
- Find evidence to support view.
- Example: Why are Dolphins called mammals?



Level 5 of thinking: Bloom taxonomy

Evaluate:

- In the **Evaluate** stage, the student can justify a decision by arguing, defending, judging, supporting, or weighing in with thoughts based on the knowledge and application they have acquired thus far.

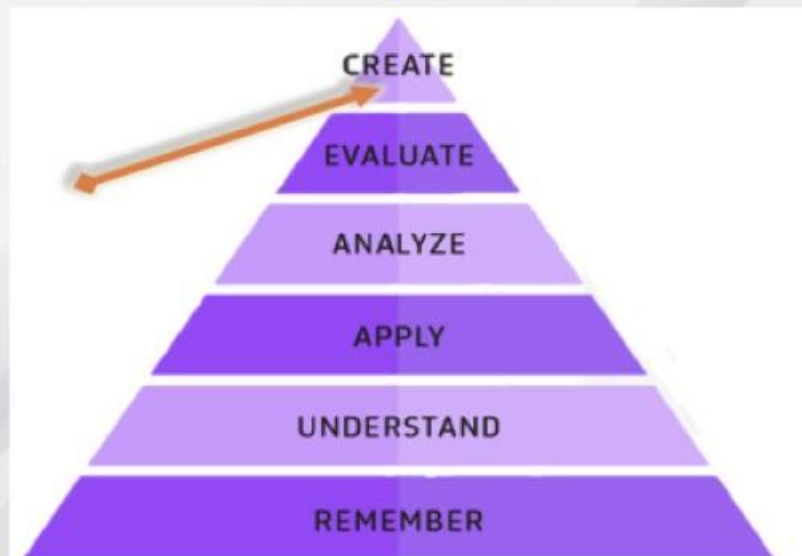


Level 6 of thinking: Bloom taxonomy

Create:

In the final level **Create** of Bloom's taxonomy:

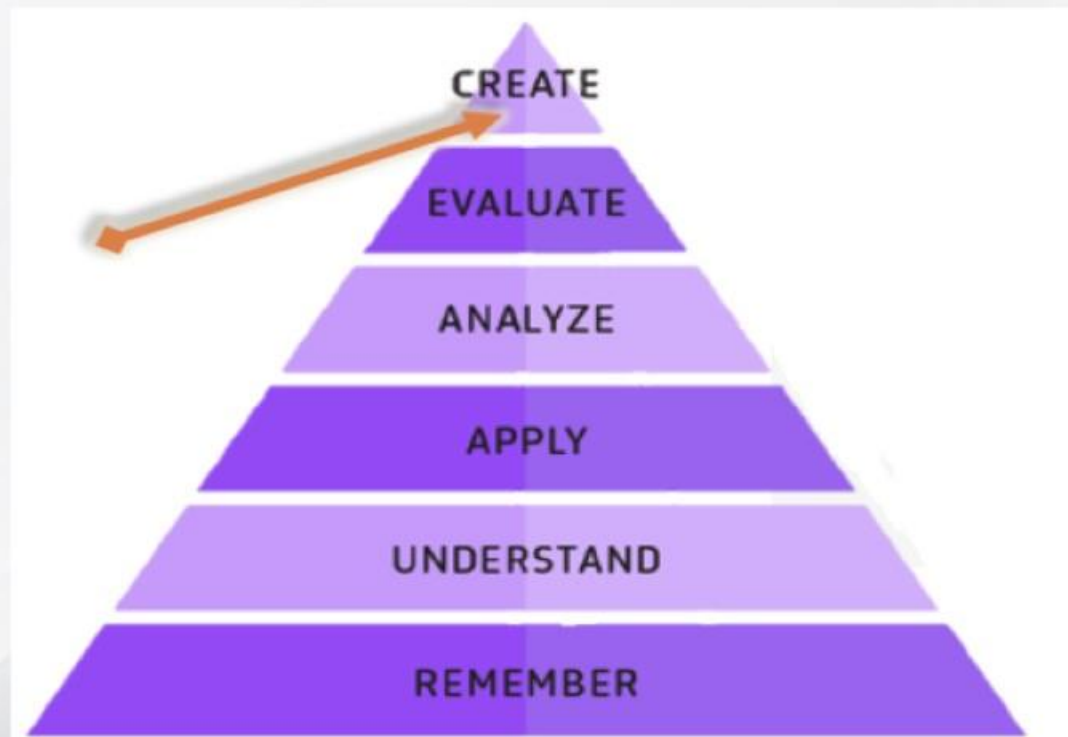
- The **student Create full knowledge** by **applying** what they have learned, analyzed and evaluated, and built.



Level 6 of thinking: Bloom taxonomy

Create:

They can design a piece of machinery, or revising a process to improve the results.



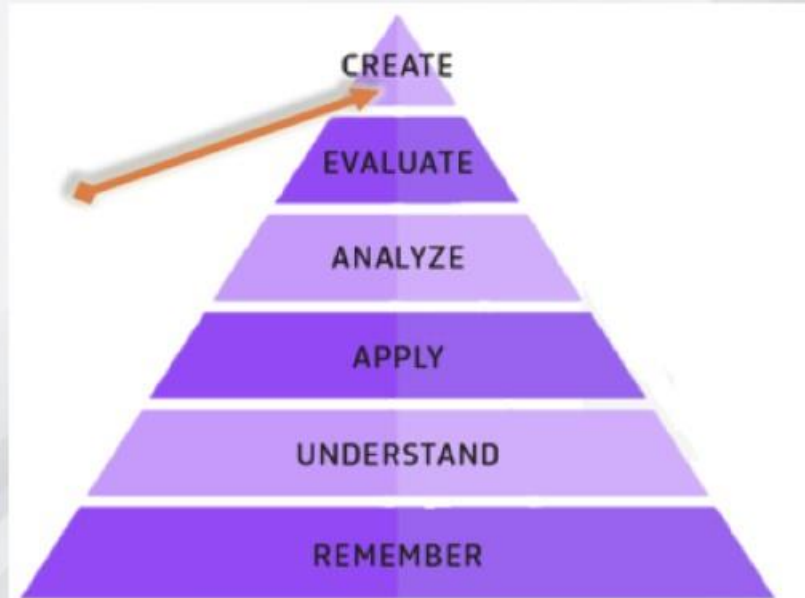
Level 6 of thinking: Bloom taxonomy

Create:

- In **Create** level of thinking using Bloom Taxonomy:

Be able to:

- Defend Opinion / Findings based on Evidence.
- Example: Why is Benjamin Franklin so famous?



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Using Bloom's Taxonomy in Designing a Course



Examples

Example 2: Using Bloom's Taxonomy in designing a course(Newton's three laws of motion)

- We are going to use the 6 levels to structure the learning objectives, lessons, and assessments of courses.

Example 2: Using Bloom's Taxonomy in designing a course(Newton's three laws of motion)

The Newton's three laws of motion:

- **Newton's First law:**

Objects in motion tend to stay in motion and objects at rest tend to stay at rest unless acted upon by an unbalanced force.

- **Newton's Second law:**

Force equals mass times acceleration ($F = ma$).

- **Newton's Third law:**

For every action there is an equal and opposite reaction.

Example 3: Using Bloom's Taxonomy in designing a course(Newton's three laws of motion)

- Before you can **Understand**—a concept, you must **be able to remember** it.
- To **apply** a concept you must first **(understand)** it.
- In order to **evaluate** a process, you must have **analyzed** it.
- To **create** an accurate **evaluation**, you must have completed a thorough aware of it.



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EXERCISE



EXERCISE:

Think about Types of Thinking Skills

Are you using all six thinking skills?

- Reflect on your life in the past three weeks and identify specific examples where you used each of the thinking skills.
- Use the comment column to write notes about the skills that are natural to you and those you would like to develop further.

EXERCISE:

Think about Types of Thinking Skills

Skill Set	How You Used It in the Past Three Weeks	Comments
Remember		
Understand		
Applying		
Analyze		
Evaluate		
Create		

Components of Scientific Thinking

Chapter

02

Whatever the type of thinking, **scientific thinkers use three components of thinking:**

The **three components of scientific thinking** are:

- Empiricism
- Rationalism
- Skepticism

Whatever the type of thinking, **scientific thinkers use three components of thinking:**

The **three components of scientific thinking** are:

- Empiricism التجريبية:
(the theory that the origin of all **knowledge is sense experience**)
- Rationalism العقلانية:
(is the philosophy that **knowledge comes from logic**)
- Skepticism الشك.



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Thank You

