

Creative and Scientific Thinking

Prepared by Prof. Shereen Taie

CRE252

Information Technology Department

Lecture 4





مجموعة جامعة
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MIDOCEAN
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Creative and Scientific Thinking

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www.midocean.ae

Learning Objectives:

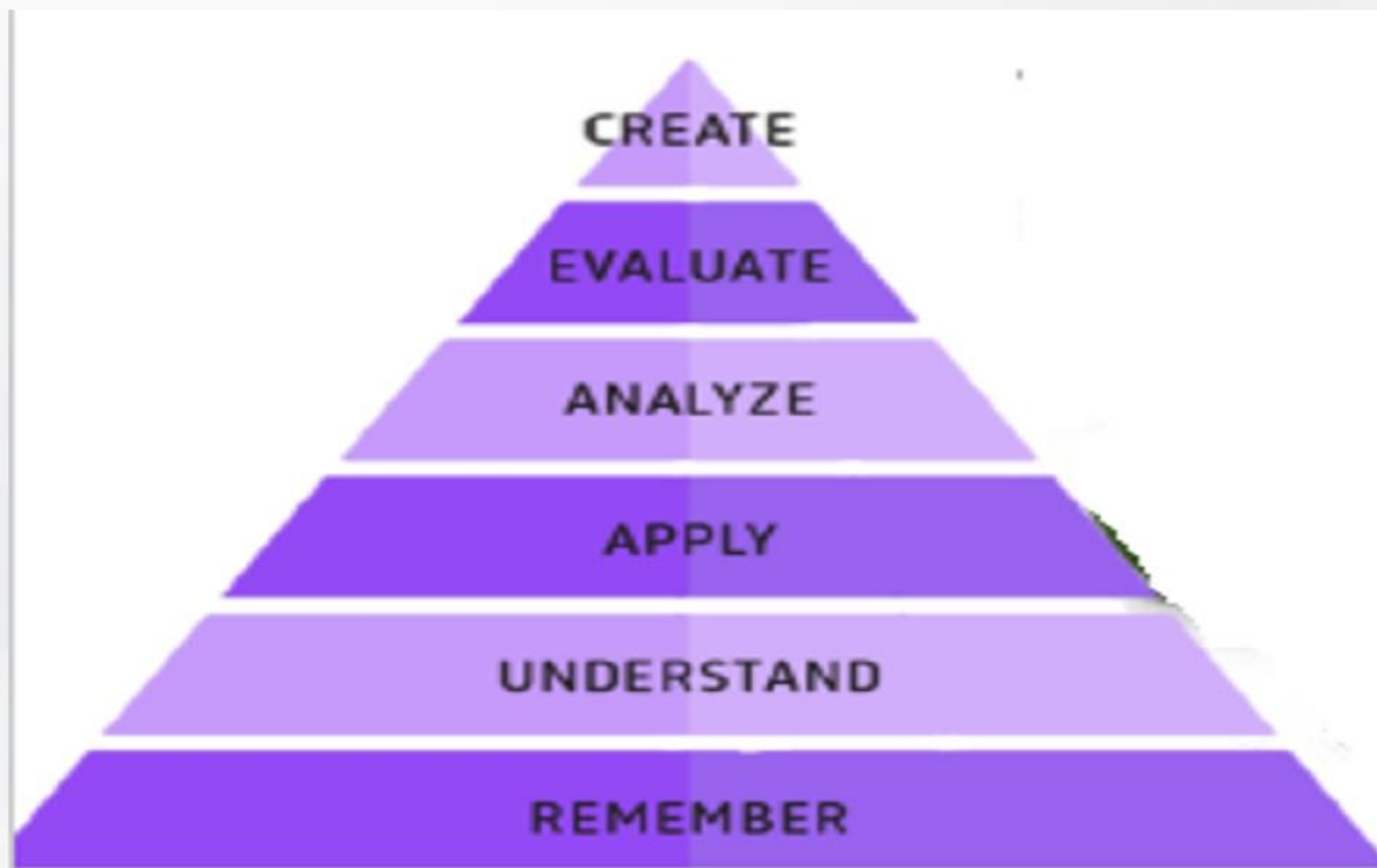
- Bloom`s Taxonomy
- Bloom`s Taxonomy Levels
- Bloom`s Taxonomy Examples
- Bloom`s Taxonomy Definition
- Levels of thinking: Bloom Taxonomy
- Low level of thinking
- High level of thinking
- Using Bloom`s Taxonomy in Designing a Course
- Components of Scientific Thinking

Bloom`s Taxonomy

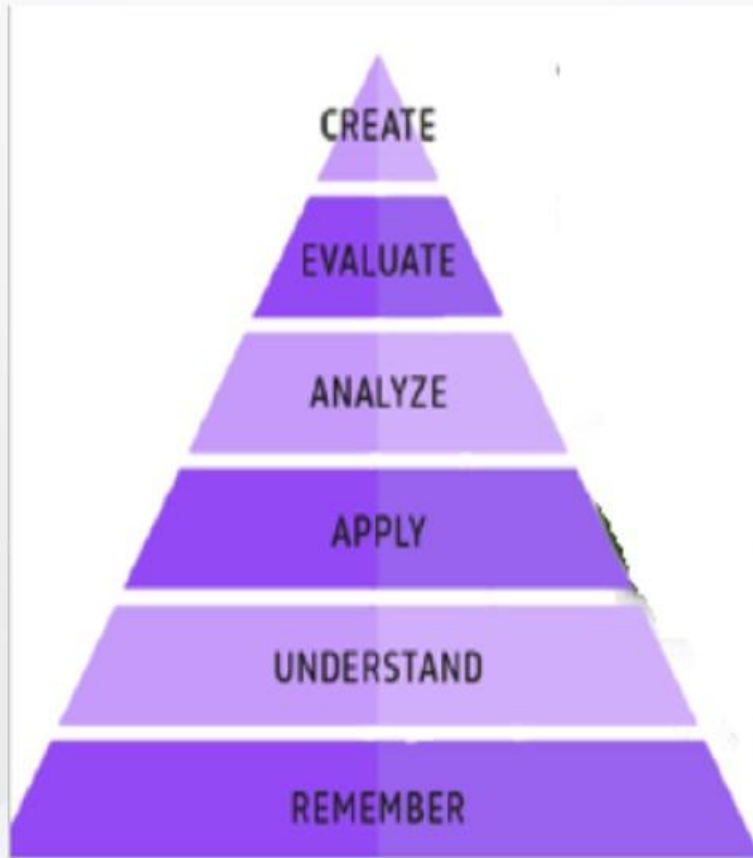
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Bloom's Taxonomy Levels:



Example 1:



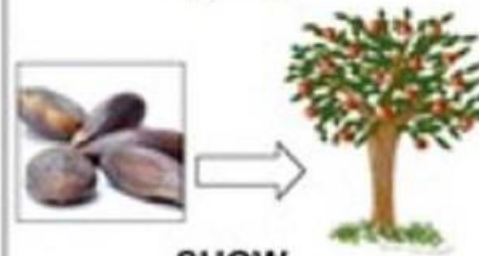
Bloom's Taxonomy

1 **Remember**
What is an apple



KNOW

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



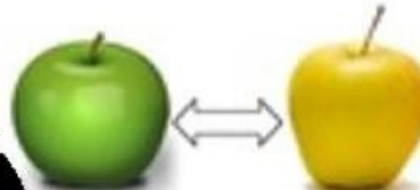
SHOW

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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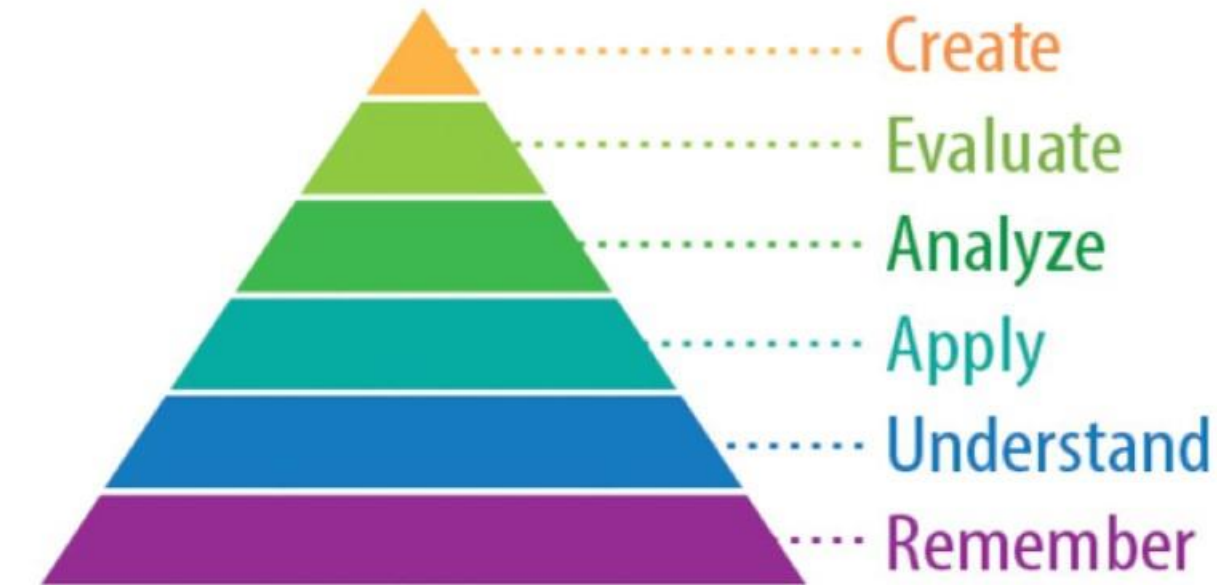
Bloom's Taxonomy Definition



Bloom`s Taxonomy Definition:

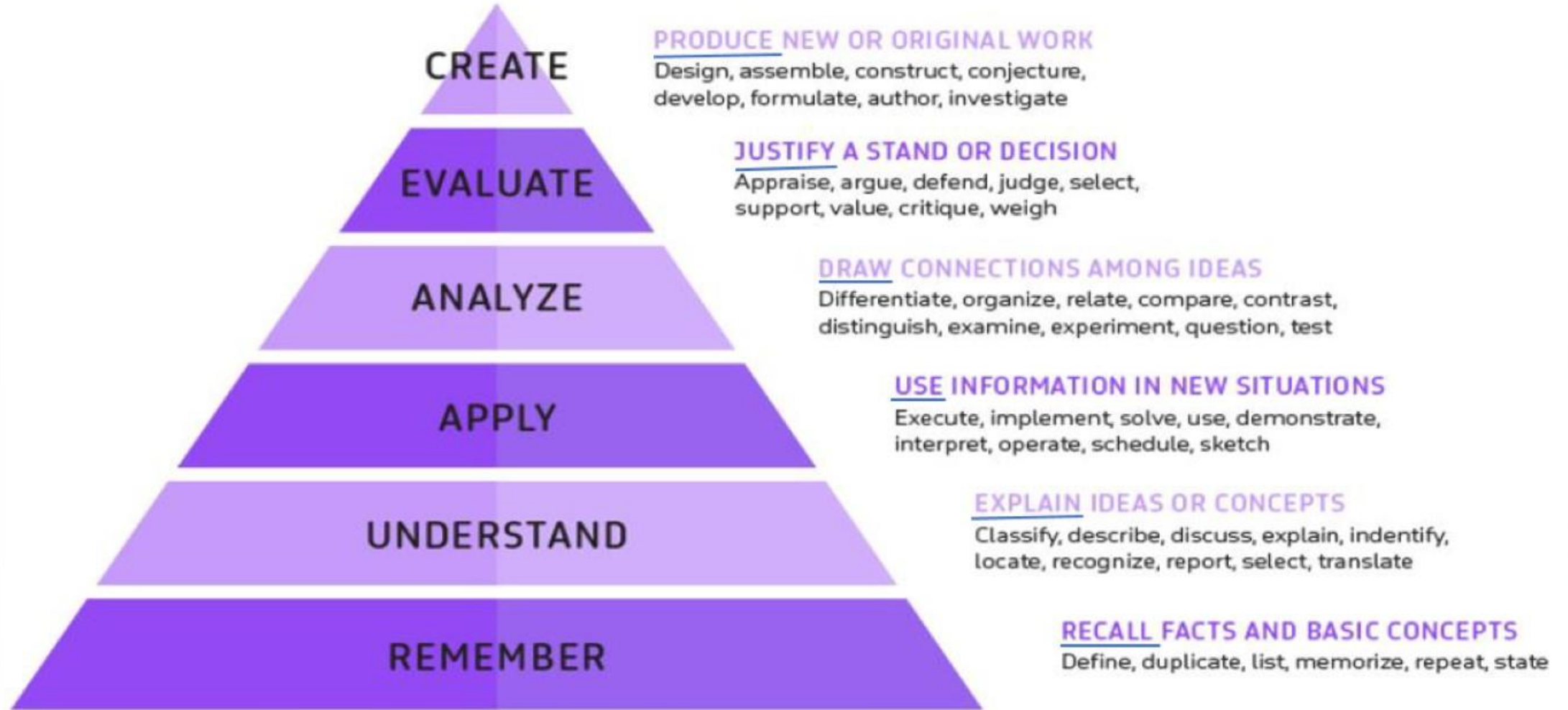
- **Bloom`s taxonomy** is a **framework** for **educational** achievement in which each level depends on the one of the following:
 - **Create**
 - **Evaluate**
 - **Analyze**
 - **Apply**
 - **Understand**
 - **Remember**

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.

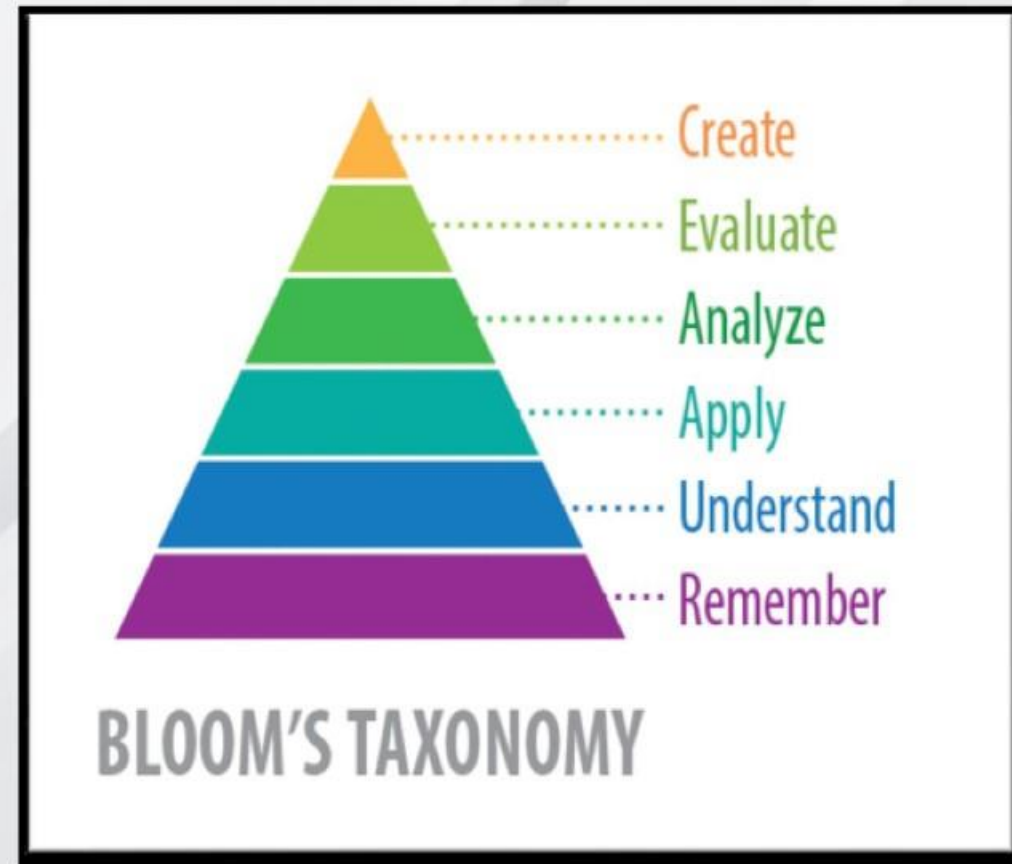
A. Low level of thinking

B. High level of thinking

Levels of thinking: Bloom Taxonomy

A. Low level of thinking: includes

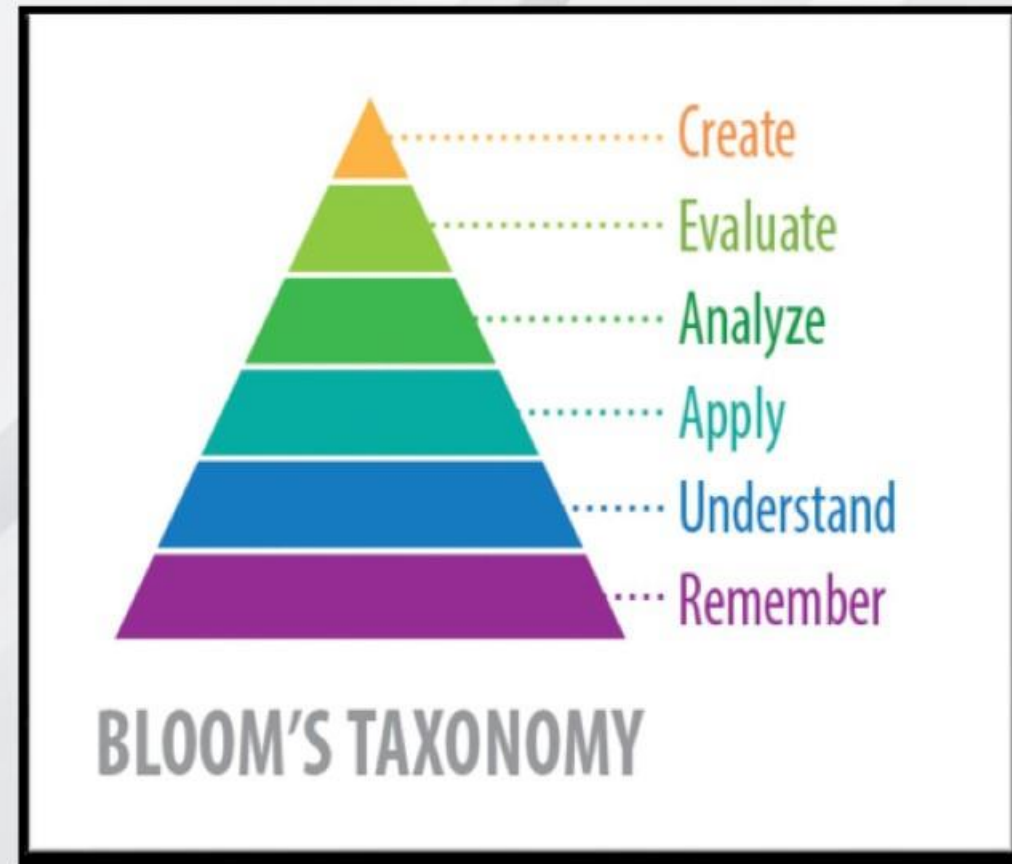
1. Remember
2. Understand
3. Apply



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



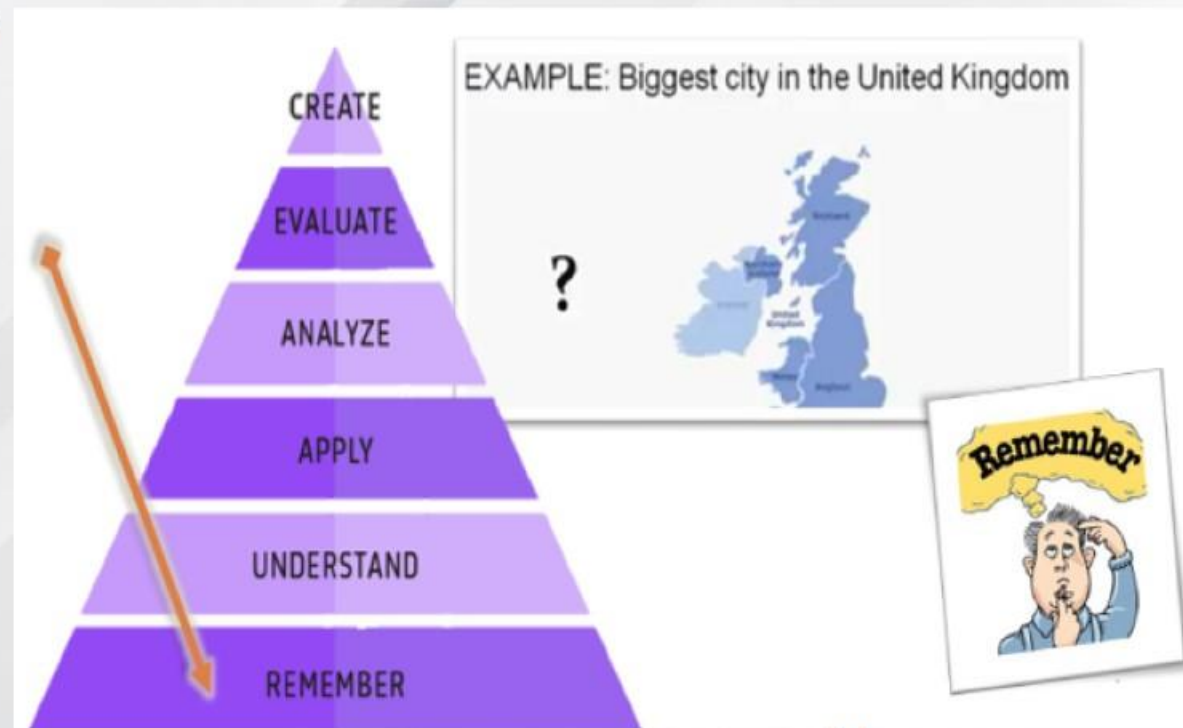
Bloom`s Taxonomy

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:

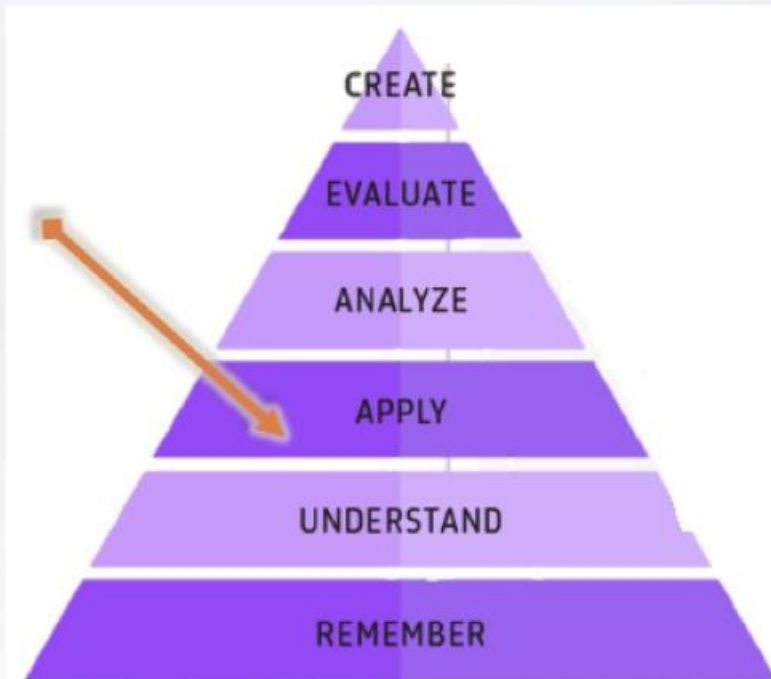
- This is where **the student understand**.
- The student explains ideas, explains what they mean and translates the facts in some way.



Level 3 of thinking: Bloom taxonomy

Apply:

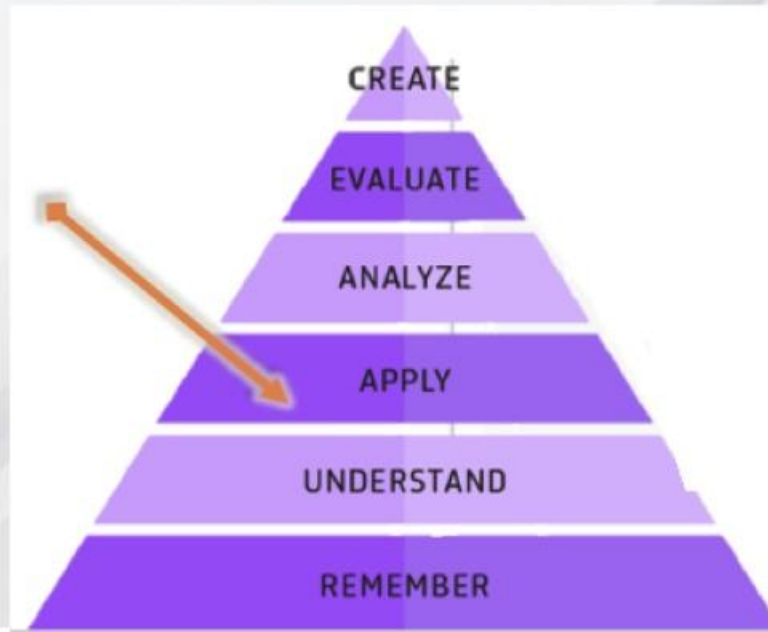
- In this level, students use the information.
- They have learned in new situations, whether it's to solve a problem, demonstrate an idea.



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:

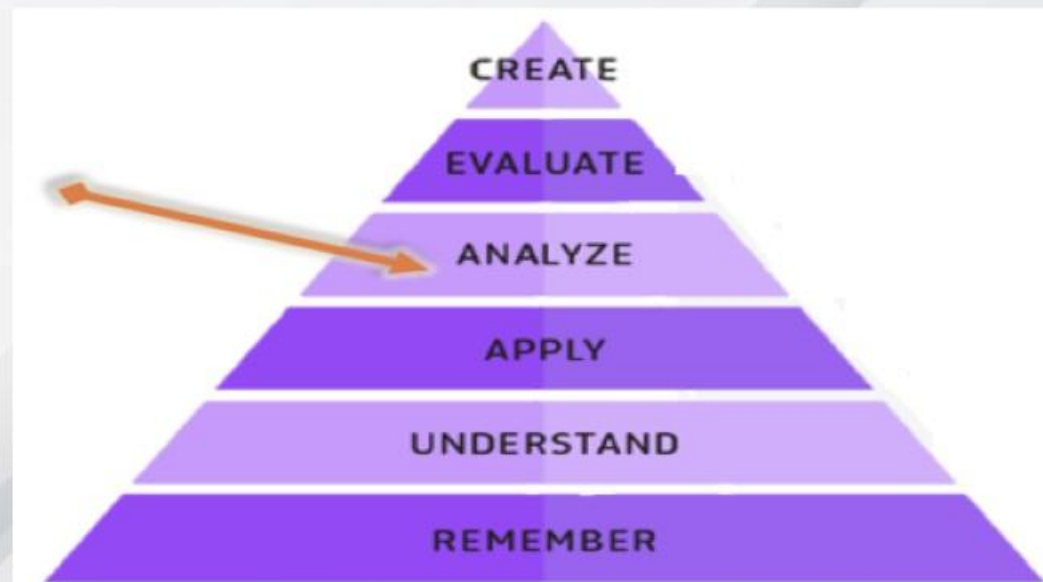
- The students must draw connections between ideas in the analyze level of Bloom's taxonomy.
- In the analyze level of Bloom's taxonomy, they must examine, question or test their knowledge.



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.



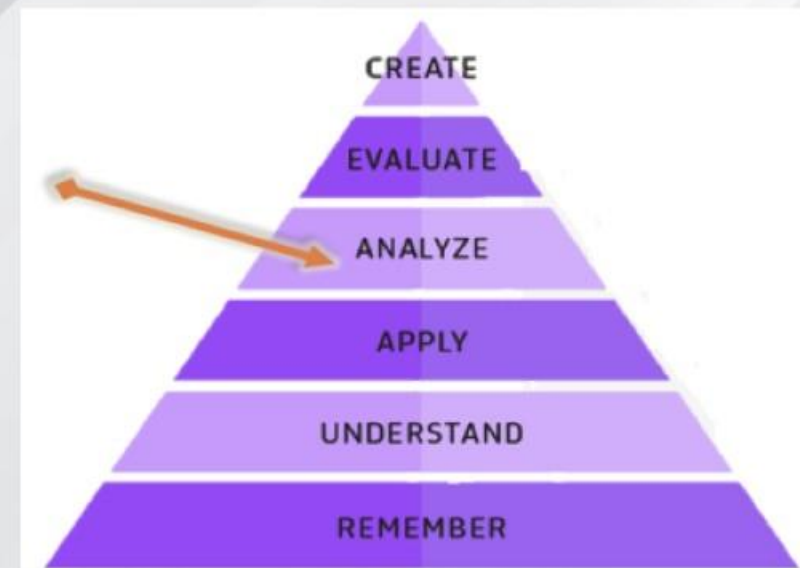
Level 4 of thinking: Bloom taxonomy

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.

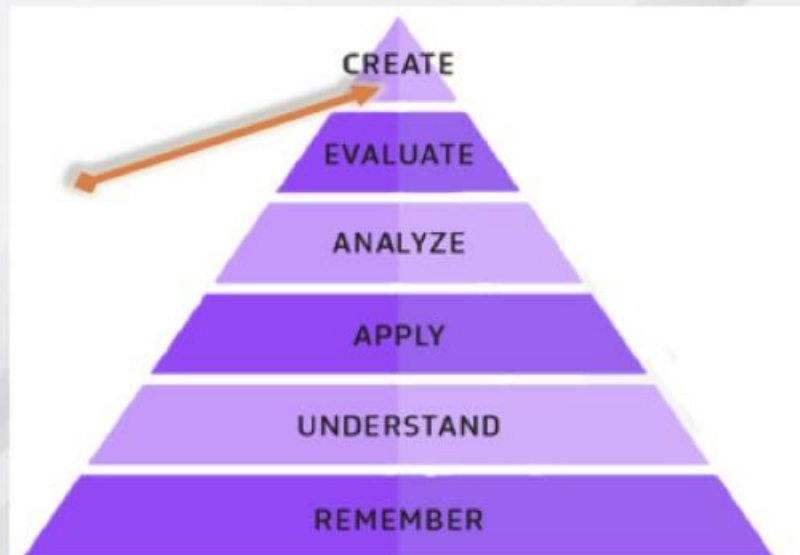


Level 6 of thinking: Bloom taxonomy

Create:

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

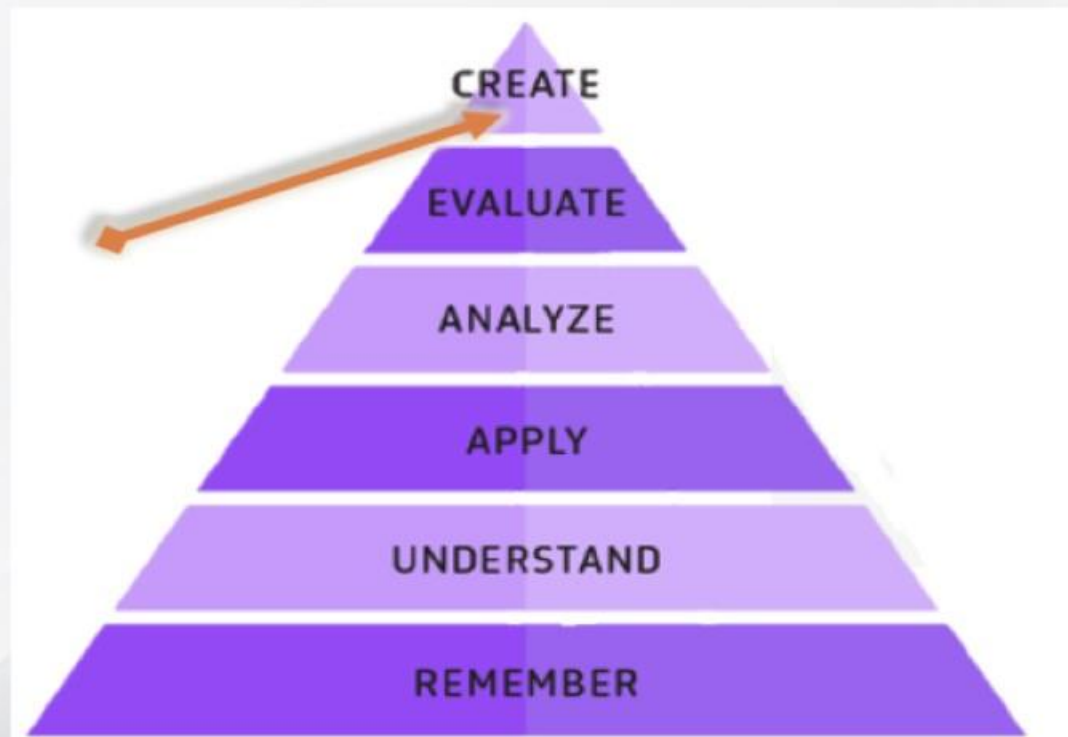
- The **student Create full knowledge** by **applying** what they have learned, analyzed and evaluated, and built.



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

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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

